Scenario Planning

An empirical investigation of methodology and practice

A thesis by:

Sotirios Levakos

University of Cambridge

St Edmund's College

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This dissertation is submitted for the degree of Doctor of Philosophy

Declaration

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. It does not exceed the prescribed word limit for the relevant Degree Committee.

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Abstract

The focus of this study is scenario planning, an approach that is widely used by businesses, policy makers and NGOs to explore the future in a systematic manner. Despite the extensive use of scenario planning and more than 50 years of scholarship, the field is still in a preparadigmatic state and scenario planning lacks a theoretical and methodological foundation. This research aims to address this gap by developing a foundation of principles and theory of scenario planning. Focusing on the *intuitive logics* tradition, the researcher examined the practice of scenario planning, i.e. what scenario planning experts do when exploring the future. The central research question that guides this thesis is: *What practices do intuitive logics scenario planning experts enact when exploring the future?* The researcher conducted multiple case studies and data were collected in very extensive and in-dept interviews with many of the world leading experts on scenario planning from Royal Dutch Shell and Global Business Network (GBN). This research found that scenario planning experts seek to *understand the clients of the scenario planning project, establish the scenario focus, examine the external environment, develop scenario sets, challenge the assumptions and beliefs of the clients,* and *catalyse conversation and dialogue*. The findings of this study are novel and challenge several well-established ideas in the literature. Remarkably, the findings of this study suggest that the term intuitive logics is not an appropriate name for the field and that the GBN 2x2 matrix method is not the 'standard' or 'dominant' approach. Most importantly, the practice of scenario planning was found to be surprisingly similar among the participants of this study, however, the way it is enacted can also be vastly different among experts and projects. This is important work that matters, especially in our turbulent times. The findings of this study inform and support the practice of scenario planning, contribute credibility and legitimacy to the field, as well as provide a foundation for further field building.

This thesis is dedicated to the memory of my father

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Finally, this thesis is dedicated to the memory of my father.

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Glossary of Key Terms

Driving Forces	Forces in the external environment that are thought to shape the future in fundamental ways. Driving forces are beyond the control of the client group.
Future studies & strategic foresight	Similar to scenario planning, future studies and strategic foresight are two fields concerned with the systematic examination of the future. While scenario planning is considered a separate field, these three fields are closely related.
Intuitive logics	One of the many traditions of scenario planning. Its origins are traced back to the work of Herman Kahn at RAND Corporation and Pierre Wack at Royal Dutch Shell.
Mental model	A set of assumptions and beliefs that structures how a person makes sense of the world. The inner model of external reality.
Official future	A set of shared assumptions and beliefs held by a group of people about the future. Quite often, the official future is the business-as-usual future.
Plausibility	A scenario is considered plausible if the audience perceives that the future situation described in that scenario may happen.
Perception iceberg	The perception iceberg is a framework or perspective that can be used to make sense of the world. The core idea is that observable events and patterns can be explained by referring to an underlying structure. This underlying

	structure, while not immediately observable, limits future possibilities.
Pre-determined elements	Future conditions which are thought to be relative certain within the relevant timeframe.
Scenario	A scenario is a story of how the future may plausibly unfold. It is neither a forecast nor a prediction: scenarios attempt to answer a different question about the future (What may happen?) than forecasts and predictions (What will happen?) and adopt a distinct stance towards dealing with the future and uncertainty. Probability is also considered irrelevant. Intuitive logics scenarios are developed in a qualitative manner and primarily through the collective thought processes of the scenario team, rather than by using quantitative models. They are predominantly qualitative in nature.
Scenario planning	*"Scenario planning is a process of positing several informed, plausible, and imagined alternative future environments in which decisions about the future may be played out for the purpose of changing current thinking, improving decision making, enhancing human and organization learning, and improving performance"* (Chermack & Lynham, 2002, p. 376).

Chapter 1: Introduction

1.1 The context

> *"Πέμψαντες γὰρ οἱ Ἀθηναῖοι ές Δελφοὺς θεοπρόπους χρηστηριάζεσθαι ἦσαν ἕτοιμοι· καί σφι ποιήσασι περὶ τὸ ἱρὸν τὰ νομιζόμενα, ὡς ές τὸ μέγαρον ἐσελθόντες ἵζοντο, χρᾷ ἡ Πυθίη, τῇ οὔνομα ἦν Ἀριστονίκη, τάδε"*
>
> *"For the Athenians had sent messages to Delphi and asked that an oracle be given them; and when they had performed all due rites at the temple and sat them down in the inner hall, the priestesses whose name was Aristonice, gave them this answer"*
>
> Herodotus, *The Persian Wars* (ca. 430 B.C.E./1922, 7.140)

The quest to know the future is perhaps as old as man himself. It is the year 481 BC. King Xerxes I of the Achaemenid Empire of Persia sets out from the ancient city of Susa to invade and conquer classical Greece. The news that the Persian Army was heading in the direction of Athens, Sparta and the other Hellenic cities came as no surprise to the leaders of the Hellenic cities. The Athenians believed that if northern Greece fell to the Persian army, Xerxes would burn Athens to the ground; evacuating the city of Athens seemed the most realistic option. Given the gravity of the situation, the Athenian Assembly voted to send an envoy to consult the Oracle of Delphi. At the heart of Delphi lied the temple and sanctuary dedicated to god Apollo. People from all over the Hellenistic world would come to Delphi to ask the god questions about the future and for advice. Apollo spoke through his appointed mouthpiece, the high priestess of the Temple, known as Pythia. Pythia served as the oracle; invoking Apollo, and after performing the necessary rituals, she would provide divine predictions of the future and wise and insightful counsel. It was customary, if not absolutely necessary, to consult the Oracle before engaging in any major undertaking such as wars or the foundation of colonies. Once the Athenian envoy returned from Delphi, the Athenian Assembly gathered at dawn in the hill of Pnyx, 400 meters west of the Acropolis, to hear, interpret, and debate the *chrismos*, the oracular response of the Oracle of Delphi. The account of Herodotus indicates that the Athenians

considered it as fundamentally important and essential to act in accordance with the response of the Oracle. The decision on how to act had to be equally based on the response of the Oracle as on other considerations. Following a heated debate about the meaning of the Oracle's response, the decision was taken to evacuate the population of Athens to the close island of Salamis and fight in the sea. While Athens was burned to the ground by the Persian army, the Persian navy suffered a severe defeat in the naval Battle of Salamis in September 480BC, marking the beginning of the end for the Persian invasion of Hellas and Europe.

Historically, the future was the realm of the gods and the supernatural. From the dawn of human history, people have been known to observe the flight of the birds, to study the patterns a fire makes as it burns, to examine the internal organs of animals, to watch cheese coagulate, and in general, carefully observe many kinds of patterns in nature, in order to reveal the will of the god (or other higher entities) and what the future holds. Oracles, and other mystic groups of people held the power of knowing the future. In ancient China, the I Ching (usually translated as the Book of Changes) was originally a divination and cleromancy manual, describing elaborate techniques of producing random numbers, turning them into divination figures or hexagrams, and interpreting their meaning. Thinking about the future and trying to find out what is going to happen is a phenomenon evident in every known culture and society.

The dawn of the 20th century marks a turn in the study of the future, with new approaches, methods and techniques being developed and applied in practice. In contrast with the arcane and the supernatural, crystal ball gazing and fortune tellers, the promise and ideals of these modern approaches to the study of future is rationality, reason, rigorousness, explicit methods, empirical observation, intellectual debate and open discussion – promises, however, not always fulfilled (Bell, 2003). These approaches, methods and techniques are not the subject of study of a unified and coherent field or discipline; instead, a constellation of related fields, a multi-field, has been formed over the decades. Scenario Planning, Futures Studies, Foresight, Strategic Foresight, and La Prospective are all closely related fields that focus on the study of the future, its methods and techniques. Historically, the main approaches to the study of the future have been forecasting, trend analysis, Delphi studies and scenario planning. However, at the time of

writing there are at least 23 different formal methods and techniques to study the future, with scenario planning being the most prominent one (Bishop et al., 2007; Slaughter, 1999).

It is also difficult to pinpoint a milestone or a specific date for the emergence of the *modern* approaches to the study of the future. Wendell Bell, one of the leading authors in Futures Studies, argues that the origins of these approaches can be traced back to the beginning of the 20th century and specifically the publication of the seminal book *Anticipations* by Herbert George Wells in 1901 (Bell, 2003). Wells also proposed a science of the future and suggested establishing Professors of the Future and entire Faculties and Departments of Foresight (Bell, 2003). Many authors consider the end of World War II and the work done at RAND Corporation for military and defence purposes as important milestones in establishing the study of the future as a formal discipline (e.g. Bradfield et al., 2005; Hines 2020). During this period, scientists and analysts developed systematic and rational techniques and methods to study the future and openly discussed their logic. The 60s and early 70s was a period of booming activity and interest in the study of the future with perhaps some of the most important milestones in its history: in 1960 the Futuribles organization was created, in 1966 the *World Future Society* was founded, in 1966 the peer reviewed journal *Futures* launched, in 1967 Herman Kahn and Anthony Wiener published their highly influential book *The Year 2000* introducing and establishing the term *scenario* in the literature. In the same year the book *The Art of Conjecture* was published by Bertrand de Jouvenel, in 1970 Alvin Toffler published his famous book *Future Shock*, in 1972 the *Limits to Growth* report was published, rising public awareness to the unsustainable path of humanity, and in 1973 the *World Futures Studies Federation* was founded.

In modern day, the formal study of the future is the subject of considerable attention of both scholars and practitioners. At the time of writing, there are five noteworthy academic peer reviewed journals, namely *Futures*, *Technological Forecasting & Social Change*, *Long Range Planning*, *Foresight* and the recently founded journal of *Futures & Foresight Science* and due to the transdisciplinary and applied nature of the subject, articles are frequently found in many other journals as well. There are also numerous academic programs that offer both courses and degrees from highly reputable

universities such as the University of Strathclyde (UK), Oxford University (UK), University of Turku (Finland), University of Houston (US) and University of Hawai'i at Mānoa (US) among others. It is exceptionally difficult to estimate how much futures work is performed in business, due to the secretive nature of the work and the lack of clear boundaries about what is considered formal future work. However, in a series of surveys conducted by Bain & Company concerning the use of management tools by managers, scenario planning usage was found to range between 20% and 70% of the respondents to the survey during the last decade, depending on the year (Bain & Company, 2018). Scenario planning is also frequently used in public policy making, and a notable recent example of this is the establishment of the position of the Commissioner for Interinstitutional Relations and Foresight in the European Union (European Commission, 2019).

In this study, the researcher focuses on scenario planning, and more specifically on the intuitive logics approach to scenario planning. There are two reasons for this conscious choice. Firstly, the intuitive logics approach seems to be the most popular and widely used formal approach to explore the future, at least according to its proponents. In addition to that, many authors and practitioners argue that the intuitive logics approach is the gold standard of scenario planning. Secondly, this research took place at the Centre of Industrial Sustainability at the Institute of Manufacturing, University of Cambridge, UK. The author of this thesis was a key researcher in the *Configurations for Sustainable Industrial Systems* research program which involved examining how a sustainable industrial system might look like in the long-term future. The intuitive logics approach to exploring the future was deemed as the most appropriate and relevant subject to investigate, primarily due to its innate focus on thinking the unthinkable.

1.2 The research problem

Despite the exploding interest in scenario planning by both industry and academia, and more than 50 years of scholarship, it can be argued that the field of scenario planning is still in an *emerging* or *pre-paradigmatic* state and has not yet fully developed into an academic discipline. The review of the literature reveals several areas that are under-researched, however, the research problem that the researcher identified and would primarily contribute to in this study is the following:

There is currently no adequate theoretical and methodological foundation underlying scenario planning.

What is currently lacking in the scenario planning literature is an adequate theoretical and methodological foundation, i.e., a system of theories, concepts, principles, and practical rules, that would inform and guide the practice of scenario planning, and which is supported by systematic and rigorous academic research. Support for the research problem comes in the form of three criticisms that are frequently found in the scenario planning literature: the lack of a conceptual and theoretical foundation of scenario planning, the existence of a methodological chaos, and the lack of scholarly rigour in the examination of the practice of scenario planning (e.g. Bradfield et al., 2005; Chermack, 2005; Derbyshire, 2017; Hodgkinson & Healey, 2008; Phadnis et al., 2014; Rowland & Spaniol, 2020, Spaniol & Rowland, 2018, Wilkinson, 2009; Wright et al., 2013).

The research gap should not be interpreted as a lack of general progress in the theory and practice in scenario planning. On the contrary, there has been substantial academic, consulting, and managerial effort in scenario planning during the last fifty years. However, as will be fully examined in Chapter 2, review of the literature, there is an apparent lack of progress at the intersection of theory and practice, at the intersection of academic rigour and relevance to practitioners. For example, it is undeniable that some efforts have been made to theoretically underpin scenario planning (e.g. Chermack, 2005; Derbyshire, 2017; MacKay & Tambeau, 2013; Wilkinson et al., 2013). However, such attempts are inadequate and do not address the lack of a theoretical and methodological foundation of scenario planning that is relevant to practice. Most of them either i) do not sufficiently inform the practice of scenario planning, or ii) are not supported by empirical evidence and systematic and rigorous academic research, or iii) concern themselves with a small aspect of scenario planning (or a combination of these elements). The subject remains clearly under-researched.

The researcher argues that addressing the identified research problem (i.e., developing a theoretical and methodological foundation of scenario planning) can be of

significant value. Firstly, such a foundation will support and inform the growing practice of scenario planning. As many authors in the literature point out, the development of scenarios is not a straightforward task and requires much more than simply following an eight-step process. Secondly, a foundation of theory and method will give credibility to and contribute to the legitimization of the field. A foundation of scenario planning would make it visible and explicit how scenario planning works, what scenario planning experts seek to achieve and how. Thus, it is possible to evaluate the methods and practices of scenario planning and improve them. Similar to what Slaughter argued in the related field of Futures Studies, "*it is essential that Futures Studies not only reach the necessary standards of intellectual and methodological rigour, but also be widely seen to do so*" (1999, p. 836). Thirdly, a commonly agreed methodological and theoretical foundation would provide focus for the further development of the field (e.g. Derbyshire, 2017). It would also make it easier to compare the diverse methods and practices of scenario planning. Finally, a theoretical and methodological foundation would help develop an identity of the field. At the moment, there are no clear boundaries and standards regarding what is and what is not considered (intuitive logics) scenario planning.

1.3 Research aim and objectives

In the previous section, the researcher argued that the lack of adequate theoretical and methodological foundation underlying scenario planning is a significant problem that hinders the development of the field and the advancement of professional practice. Thus, the ultimate objective of this research is to contribute to addressing this gap. In order to achieve this, this research systematically and deeply examines the practice of scenario planning, i.e., what scenario planning experts do when they examine the future and why. Scenario planning is first and foremost a practical activity conducted by actual people, the scenario planning experts, consultants, professionals. Following Giddens and other scholars, the scenario planning experts are considered as *knowledgeable agents*, i.e. they can explain and therefore give an account of their actions, thoughts, intentions and are reflexive and purposeful (Giddens, 1984; Giddens & Pierson, 1998; Gioia et al., 2013; Orlikowski, 2002). It is the scenario planning experts who have practical knowledge about how to successfully conduct scenario planning, what works and what does not work. Therefore, this research taps into the knowledge and expertise of the people who

actually practice scenario planning. In line with practice theory, the researcher distinguishes between *situated, actual activity* and the *structures of action*, (i.e. principles and rules that guide action) as two aspects of practice (Feldman & Pentland, 2003; Reckwitz 2002; Schatzki, 2006; Whittington 2006). The ultimate intention is to generate more technical concepts and theories based on the everyday concepts and interpretations of the scenario planning experts. However, it is fundamental that the scenario planning experts recognize themselves within the researcher's accounts.

At a first level, an outcome of this research is an improved understanding of the practice of scenario planning, in the form of a system of principles that scenario planning experts enact when they examine the future. This will fill an important gap in the literature, as the practice of scenario planning is an area that is essentially under-researched. However, these principles are developed based on the practical knowledge and expertise of scenario planning experts about how to successfully conduct scenario planning. Therefore, these principles are not only a description of the scenario planning practice, but they can also serve as a normative guide that informs the practice of scenario planning. Finally, this research is exploratory in nature; while the researcher develops and puts forward several principles of scenario planning based on the scenario planning experts' accounts, the extent to which these principles contribute to and can explain the success of scenario planning projects is subject to future research.

Finally, this research is exploratory in nature; while the researcher develops and puts forward several principles of scenario planning based on the scenario planning experts' accounts, the extent to which these principles contribute to and can explain the success of scenario planning projects is subject to future research.

In summary, this research aspires to bridge the gap between the theory and practice of scenario planning, to be both academically rigorous and relevant to practitioners. More formally, the objectives of this research are:

To advance the understanding of the practice and methodology of scenario planning.

To build a foundation of principles and theory of scenario planning from that better understanding of practice.

1.4 Structure of the thesis

The structure of the rest of the thesis is as follows. In Chapter 2 the researcher critically reviews the literature on intuitive logics, scenario planning and other related fields. In total more than 250 journal papers and books were reviewed. The researcher provides an overview of the intuitive logics field and identifies and brings forward three knowledge gap areas regarding the practice, method and theory of scenario planning. Before establishing the research question that this research seeks to answer, the researcher provides an overview of practice theory and introduces practice as a conceptual lens. The research question is clearly established at the end of Chapter 2.

The research method that the researcher used to answer the research question, as well as the underlying philosophy and principles are the subject of Chapter 3. The researcher adopted interpretivism as the theoretical paradigm of this study, conducted multiple case studies of scenario planning experts, collected data primarily using the interview technique and analysed the data using thematic analysis. Chapter 3 concludes with a discussion on the standards for the quality of the conclusions for this research and the measures he took to ensure the high quality of the work.

In Chapter 4, the researcher presents the findings of this research. In total, six themes were developed based on the data, namely *understanding the clients, establishing the scenario focus, examining the external environment, developing scenario sets, challenging assumptions,* and *catalysing conversation and dialogue.* Each of the six themes is presented in detail, along with the data to support them.

Chapter 5 is a discussion of the findings of this research, which are compared with the extant literature on scenario planning, along with the broader patterns that the researcher identified in the data. The findings of this research have important implications for a wide range of topics, including the appropriateness of the term intuitive logics, the alleged dominance of the GBN 2x2 matrix process, the similarity of practice among scenario planning experts, and the concept of plausibility among others. The chapter concludes with limitations of this study as well as suggestions for a future research agenda.

Finally, the conclusions to this thesis can be found in Chapter 6.

Chapter 2: Literature review

'*To advance our collective understanding, a researcher or scholar needs to understand what has been done before, the strengths and weaknesses of existing studies, and what they might mean. A researcher cannot perform significant research without first understanding the literature in the field.*'

(Boote & Beile, 2005, p. 3)

2.1 Introduction

This chapter constitutes a critical review of the literature related to the intuitive logics approach to scenario planning. The researcher provides an overview of the field, critiques existing work, evaluates the current status of knowledge and identifies central issues in the field. The researcher identified three interrelated knowledge gap areas that formed the foundation for formulating the research questions and objectives that guided this research.

The rest of this chapter is as follows. In section 2.2 the researcher explains how he searched for and selected relevant literature. In total, more than 250 journal papers and books have been reviewed from the literature on intuitive logics, scenario planning in general and other closely related fields such as Foresight and Futures Studies. Following that, in section 2.3 the researcher provides an overview of scenario planning field which includes at least 23 different methods and techniques to develop scenarios; intuitive logics is just one of them. The focus of section 2.4 is the history of the term intuitive logics, how it came into being and what it refers to. Sections 2.5 and 2.6 examine the definitions of scenarios and scenario planning as they appear in the literature. The idea that scenario planning is different from forecasting is the subject of section 2.7. The espoused benefits, objectives and other outcome variables of scenario planning, as well as the insufficient research that empirically examines these outcome variables, are covered in section 2.8. The researcher provides an overview of the status of knowledge concerning the practice of scenario planning, its methodology and its theoretical foundation in sections 2.9 and 2.10. These three areas (practice, methodology, theory) are fundamentally important for

establishing the knowledge gap in section 2.11. To formulate the research question that this research will answer, the researcher draws upon practice theory, a primer of which is presented in section 2.12. Finally, the research question is established in section 2.13.

2.2 Searching for and selecting relevant literature

Given that the subject of this research is the intuitive logics approach to scenario planning, the researcher primarily focused on and sought to identify and select publications that are concerned with this specific approach. However, the review was also informed by publications that are concerned with scenario planning in general, as well as publications from related topics such as *foresight* and *futures studies*.

The procedure the researcher used to search for relevant literature is based on the snowballing sampling approach (Easterby-Smith et al., 2015; Wohlin, 2014), and involved two separate keyword searches as the starting point. The first keyword search consisted of searching the Scopus and Web of Knowledge online databases and the Cambridge University Library catalogue, using the term *scenario planning*. The keyword search resulted in a combined total of 1,633 peer reviewed articles and books or book chapters, not all of which were found to be relevant to this study. In order to gain a first sense of the field, the researcher focused on existing reviews of the scenario planning literature (e.g. Amer et al. 2013; Chermack et al., 2001; Varum & Melo, 2010), articles that provide an overview of the field (e.g. Bishop et al., 2007; Börjeson et al., 2006; Bradfield et al., 2005; van Notten et al., 2003) and the most cited papers (e.g. Peterson et al., 2003; Schoemaker, 1993). The second keyword search consisted of searching the aforementioned databases using the term *intuitive logics*. This search resulted in a total of 82 peer reviewed articles and books or book chapters, the majority of which were from unrelated subject areas (e.g. nutrition, computer science). Only 32 of them were found relevant to the purposes of this research and were therefore included. The researcher then used the prioritized results of the *scenario planning* keyword search and the results of the *intuitive logics* keyword search in order to identify further relevant literature. A number of experts in the scenario planning field (practitioners or academics) that the researcher met during this research (e.g. in academic conferences) were also asked to recommend important literature. The review of the literature was not limited to peer

reviewed articles published in academic journals, but also included books such as *The art of the long view* by Peter Schwartz (1991) and *Scenarios: The art of strategic conversation* by Kees van der Heijden (1996; 2005), doctoral theses such as *The evolution of scenario planning* by Alexander Van de Putte (2012) and process guides and reports such as *The Futures Toolkit* by the UK Government Office for Science (2017), Scenarios: An Explorer's Guide by Shell (2003) and *Strategic Foresight Primer* by European Political Strategy Centre (2017). In total, this literature review is informed by over 250 publications.

2.3 Scenario planning as a heterogeneous field

The many methods and approaches for developing scenarios

An important first observation that the researcher makes from reviewing the literature is the existence of a wide range of scenario methods and approaches. This observation is especially evident in many papers that provide an overview of the scenario planning field but also elsewhere (e.g. Amer et al., 2013; Bishop et al., 2007; Bradfield et al., 2005; Huss & Honton, 1987a; Martelli, 2001; Ringland 1998; Varum & Melo, 2010; Wilkinson & Eidinow, 2008). To provide a tangible example, Bishop et al. (2007) systematically surveyed the literature with the purpose of identifying '*all the techniques for developing scenarios that have appeared in the literature*' (p. 5). Their findings include 26 different techniques which the authors categorize in eight categories. The table below was created by the researcher and summarizes these techniques and categories as reported by Bishop et al. (2007).

Category	Technique	Distinguishing characteristic
1) Judgement	a) Genius forecasting b) Visualization c) Role playing d) The technique of Coates and Jarratt	*"Judgemental techniques rely primarily on the judgement of the individual or group describing the future"* (p.11). (emphasis added by researcher)
2) Baseline/Expected	a) Trend extrapolation b) The Manoa technique c) Systems Scenarios d) Trend impact analysis	Techniques of this category produce only one scenario, the expected future. This is typically achieved by extrapolating existing trends into the future.

3) Elaboration of fixed scenarios	a) Incasting b) The SRI matrix technique	The kernels of the scenarios are decided ahead of time. The participants then elaborate the scenarios.
4) Event sequences	a) Probability trees b) Sociovision c) Divergence mapping	The future is conceptualized as a series of events extending from the past and branching at various events/points.
5) Backcasting	a) Horizon mission methodology b) Impact of Future Technologies c) Future mapping	Backcasting techniques start by developing a future end state and then working backwards to identify the events leading to the specific future.
6) Dimensions of uncertainty	a) Morphological analysis b) Field anomaly relaxation c) The GBN matrix technique d) MORPHOL e) OS/SE	Sources of uncertainty are developed before the development of scenarios. The scenarios are then developed based on the future outcomes of the uncertainties.
7) Cross impact analysis	a) SMIC-PROB-EXPERT b) Interactive Future Simulation	Techniques of this category assign relative probabilities of occurrence to the scenarios developed.
8) Modelling	a) Trend Impact Analysis b) Sensitivity Analysis c) Dynamic Scenarios	Scenarios are developed by *"varying the inputs and/or the structure of the models that generate the prediction"* (p.16)

Table 1: Techniques used to develop scenarios. Based on Bishop et al. (2007).

It is important to note that other authors in the literature have categorized scenario development techniques in a different manner and not everyone might agree with the categories that Bishop et al. (2007) suggest or on the main characteristic of each technique. It is also important to mention that the methods and approaches that Bishop et al. (2007) and others report are remarkably diverse and may exhibit conflicting characteristics. For example, consider the differences between the cross-impact analysis method that relies heavily on probabilities and Monte Carlo simulations (Gordon, 1994b) and the intuitive logics approach that considers probability as irrelevant and is qualitative in nature (Ramírez & Selin, 2014).

In conclusion, the review of the literature demonstrates the existence of a wide range of techniques that are used to develop scenarios (which may exhibit radically different characteristics) and illustrates that the intuitive logics is only one of the many methods and approaches of scenario planning.

The many types of scenarios

In a similar manner that many authors report a wide range of scenario planning methods and techniques, various authors in the literature report various types of scenarios (e.g. Börjeson et al., 2006; Ducot & Lubben, 1980; van Notten et al., 2003). Consider for example the work of Börjeson et al. (2006) who suggest a typology of scenarios based on "*the principal questions we believe a user may want to pose about the future*" (p. 725). Based on the work of Börjeson et al. (2006), the researcher developed Figure 1, which demonstrates the broad meaning that is ascribed to the term scenario.

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Figure 1: Different types of scenarios, demonstrating the broad meaning assigned to the term scenario. Based on Börjeson et al. (2006).

Börjeson et al. (2006) consider all six types of descriptions of a future as scenarios. However, many scholars and practitioners of the intuitive logics approach reject this idea and argue that scenarios are not forecasts or visions (e.g. Lindgren and Bandhold, 2003; Meristö 1989; Ramírez & Selin 2014; Schoemaker, 1991; van der Heijden 2005;

Wilkinson 2009,). Börjeson et al. (2006) do mention that they have *"chosen to use a broad scenario concept that also covers predictive approaches with sensitivity testing"*, indicating however that "*early scenario developers such as Kahn and Wiener would reject such a use of the term*" (p. 723).

Scenario planning, an umbrella term

A second important observation that the researcher makes is that the terms *scenarios* and *scenario planning* are very often used in the literature as umbrella terms. As demonstrated in the first part of this section, the term scenario planning is very often used to refer to a very diverse set of methods and techniques rather than a single method. Similarly, as demonstrated in the second part of this section the term scenario is used to refer to images of a future with a wide range of characteristics. In the researcher's view, bringing all these diverse set of methods and types of scenarios under the terms *scenario planning* and *scenarios* respectively indicates that sometimes the terms *scenario* and *scenario planning* are used in a very broad sense.

Based on the review of the literature, the researcher offers the following definitions: a scenario in its broadest sense is simply an image of a future; and scenario planning in its broadest sense involves the development of such an image of a future to fulfil a specific purpose, typically to inform a decision of a kind. However, the researcher recognizes that his definition is so broad that forecasting and sensitivity testing would also be considered as scenario planning, an idea that many scholars reject. Interestingly, the terms scenario and scenario planning are also used in forecasting and sensitivity testing. The researcher was not able to identify in the literature commonly accepted and explicit boundaries about what should be considered scenario planning and what not.

Nevertheless, the fact remains: the term *scenario planning* is neither used exclusively by scholars and practitioners of the *intuitive logics* tradition nor is it used to refer exclusively to the intuitive logics approach. The term scenario planning is used to refer both to a wide range of scenario methods and approaches but also to individual methods and approaches. Many scholars and practitioners of the intuitive logics approach do mention that the term scenario planning is used in the literature to refer to many different methods and approaches. However, within their own tradition, scholars of the intuitive

logics tradition often reject such a broad definition and ascribe specific defining characteristics to the intuitive logics scenario planning, which separates it from the generic use of the term and from other methods and approaches. Scholars of other traditions do the same.

2.4 A brief history of the intuitive logics construct

The origins of the term

The term intuitive logics was first introduced in the scenario planning literature in two papers (identical in their essence) by Huss and Honton that were published in the same year (1987a, 1987b). The increased use of scenario analysis occurred simultaneously with the growth in the number of different scenario planning techniques and methods, which the authors classify into three major categories:

- intuitive logics, as practiced by SRI International, Royal Dutch/Shell, and others, and described by Pierre Wack (1985a, 1985b),
- trend impact analysis, practiced by The Futures Group and many futurists,
- cross impact analysis, including the INTERAX approach and the BASICS (Battelle Scenario Inputs to Corporate Strategy) approach that were developed by the Centre for Futures Research and Battelle respectively.

In these two papers, the authors present and examine the eight step SRI International method, as they consider it the exemplar of the intuitive logics approach. According to Huss and Honton, the core characteristic of the SRI method that lends its name to the approach and distinguishes it from the trend-impact and cross-impact approaches is the intuitive development of the scenario logics. The authors describe the scenario logics as "*organizing themes, principles, or assumptions that provide each scenario with a coherent, consistent and plausible logical underpinning"* (1987a, p. 22) and state that the scenario logics are developed "*from an intuitive, logical perspective*" (1987a p. 23). They further comment that the intuitive logics approach is not tied to any mathematical algorithm and that the trend impact and cross impact approaches are more quantitative. Both the trend-impact and the cross-impact approach, as described in Huss and Honton (1987a, 1987b) but also elsewhere (e.g. Gordon, 1994a, 1994b), rely on

mathematical models and/or computer simulations to develop the scenarios. The authors however do not adequately explain either the concept of the *scenario logic* or what it means to develop the scenarios logics "*from an intuitive, logical perspective*". According to the Oxford dictionary the word intuitive means "*using or based on what one feels to be true even without conscious reasoning; instinctive*". It is not clear whether Huss and Honton actually meant that the scenario logics are developed without conscious reasoning and based on what the scenario team feels instinctively to be true or whether they meant something different.

The review of the literature indicates that there is a wide consensus among the authors that the intuitive development of the scenarios is one of the defining and differentiating characteristics of the intuitive logics approach (e.g. Bradfield et al., 2005; Derbyshire & Wright, 2017; MacKay & Tambeau, 2013; Phadnis et al. 2015; Ramírez & Wilkinson, 2014; Spaniol & Rowland, 2018; Wright et al., 2013). However, there is less consensus about the actual meaning of the term *intuitive logics* and multiple interpretations can be found in the literature.

In a number of cases, some well cited authors (e.g. Bradfield et al., 2005; Cairns et al., 2004) attempt to explain the term intuitive by referring to the idea of *disciplined intuition* as described in Jungermann and Thuring (1987). For example, Cairns et al. (2003) write "*as implied by its name, the intuitive logic model relies on the development of scenarios from 'disciplined intuition'*" and refer to the work of Jungermann and Thuring (1987). Jungermann and Thuring, in a theoretical consideration of how people think when they generate scenarios, argue that the "*method requires a very specific use of knowledge that has not yet been studied; sometimes this is called 'disciplined intuition'*" (p.246). The authors then derive what they call a framework of "*what actually goes on in experts' minds when they construct scenarios of possible futures"* (p.265) that involves different types of cognitive search strategies such as specific and non-specific, backward and forward searches. The authors note that their work is not on safe ground and most importantly, validation of the model in real life applications of scenario development is needed.

While the interpretation of the term intuitive as disciplined intuition is supported by important and well cited authors, other authors do not directly refer to the model of Jungermann and Thuring. A second group of authors use the word intuitive with its dictionary meaning, as described above and often contrast it with rational analysis. Those authors claim that this intuitive element plays a strong element in the development of the scenarios. For example, Wilson (1998) explains that the development of scenarios is intuitive "*in the sense that it builds on the hunches, gut feelings, assessments of uncertainty and possible outcomes of the most knowledgeable people"* (p. 81). Wilson then adds that *"the model is also logical, formal, and disciplined in its use of information, analysis and a structured approach to the task*" (p. 82). Similarly, MacKay and Tableau mention that the process of developing scenarios alternates "*between intuitive exploration of knowledge and rational analysis*" (2013, p. 674). The same reliance on intuition can also be found in van der Heijden (2000).

A third possibility is offered by the researcher. It is quite possible that Huss and Honton did not have in mind a model as specific as Jungermann and Thuring's and that they did not want to indicate that the scenario logics are developed based on what one feels to be true even without conscious reasoning. It is possible that Huss and Honton wanted to simply indicate that the scenario logics are not developed through mathematical models or computer simulations but are the product of the individual and collective thought processes of the members of the team that is developing the scenarios. The researcher's suggestion is based on:

i) Huss and Honton's style of writing (e.g. they define the intuitive logics approach by comparing to trend and cross impact approaches that are described as more quantitative).

ii) In the scenario planning and futures studies literature, authors often make a distinction between quantitative methods and qualitative methods (e.g. Bell, 2003; Godet, 1983; Gordon, 1992; Ramírez & Selin, 2014; Schnaars, 1987). It is interesting to note that while quantitative approaches are often defined as those approaches that involve mathematical and statistical models and computer simulations, qualitative approaches are defined as those that involve none of that.

The intuitive logics approach is classified as a qualitative approach (e.g. Bradfield et al., 2005; Ramírez & Selin, 2014; van der Heijden, 2005).

iii) During the time that Huss and Honton published their papers, there was an ongoing debate in the literature about the advantages and disadvantages of qualitative and quantitative methods (e.g. Godet, 1983; Schnaars, 1987)

iv) Huss and Honton describe other techniques such as surveys, interviews, Delphi techniques morphological analysis, nominal group and brainstorming as intuitive techniques. However, these techniques are mostly described in the literature as qualitative approaches (e.g. Gordon, 1992) or based on judgement (Bishop et al. 2007).

Therefore, it is possible that Huss and Honton used the term intuitive to indicate that it is a qualitative approach, but chose a different term than qualitative, in order to separate it from other qualitative techniques such as Delphi techniques and morphological analysis. Nevertheless, the fact remains: while there is a widely held consensus among the authors of the intuitive logics approach that the intuitive development of the scenarios is a defining and distinctive characteristic of the approach, the exact meaning of the term intuitive logics is elusive, as well as the rationale why it was chosen as the name of the approach.

A rise in popularity

In 2005, one of the most cited papers in scenario planning was published, authored by Ron Bradfield, George Wright, George Burt, George Cairns and Kees van der Heijden. It can be argued that the growth in popularity of the term intuitive logics is attributable to the subsequent work of some of this paper's authors. Before this publication and between 1987 and 2005 however, the term intuitive logics was rarely used in the scenario planning literature. According to the Scopus database, between 1987 and 2005 only four papers use the term *intuitive logics* in the article title, abstract or keyword field. Two of these four articles are the original papers authored by Huss and Honton, another publication is the subsequent work of Huss (1988) and the last paper is written by Cairns et al. (2004), the very same authors who wrote the seminal 2005 publication.

During the period of 1987 to 2005, some authors do mention the term intuitive logics. However, the term is mainly used to simply make the point that there are different approaches to scenario planning (e.g. Chermack & Lynham 2002; Gausemier et al., 1998; Phelps et al. 2001). Authors did not use the term intuitive logics to describe the subject of their study and their own practice. They would instead prefer terms such as 'the Pierre Wack approach' or 'the Shell tradition' or simply 'scenario planning' (e.g. Burt & van der Heijden, 2003; Miller & Waller, 2003; Schoemaker, 1993; Wilkinson, 2009).

The starting point of the seminal paper by Bradfield et al. (2005) is very similar to the opening argument of Huss and Honton (1987a, 1987b): the authors report the existence of '*a large number of different and at times conflicting definitions, characteristics, principles and methodological ideas about scenarios*' in the literature (p. 796). This is considered a major issue for '*the future of the scenario method*' that the authors hope to begin addressing it by classifying existing scenario methodologies into schools of techniques and tracing the origins of each school. Referring to the work of Huss and Honton, Bradfield et al. recognize the intuitive logics schools as a distinct school of scenario techniques, propose the integration of the trend impact and cross impact techniques into the *probabilistic modified trends school* (PMT) and bring attention to the *la prospective school*. The authors present 14 dimensions across which the three schools are different, however, they emphasize that the most important difference between the intuitive logics approach and the PMT and la prospective schools is regarding attaching probabilities to scenarios. While both the PMT and la prospective schools involve attaching probabilities to events and/or scenarios, under the intuitive logics approach, all scenarios should be presented as equally probable/plausible. The review of the literature further indicates that there is almost unanimous consent among the various authors that probabilities should not be attached to scenarios under the intuitive logics approach (e.g. Amer et al., 2013; Derbyshire 2017; Ramírez & Selin, 2014). For example, Ramírez and Selin (2014) argue that "*a distinctive characteristic of the intuitive school is that it explicitly considers probability to be irrelevant in scenario work"* (p. 61). The researcher would like to point out that the irrelevance of probability in the intuitive logic scenarios should not be confused with the idea that scenarios need to be plausible. All three schools (intuitive logics, PMT and la prospective) advocate that scenarios need to

be perceived as plausible, and while this is an important idea, it is not a distinguishing feature of the intuitive logics approach.

It is interesting to note that in Bradfield et al. (2005), the authors make absolutely no mention of Global Business Network (GBN) or the 2x2 matrix-based process (Schwartz, 1991). In subsequent publications, some of the authors of the 2005 publication would essentially equate the GBN 2x2 matrix process to the intuitive logics approach (e.g. Bradfield et al. 2016; Wright et al. 2013), a position that is adopted by other authors as well (e.g. Derbyshire & Giovanetti, 2017; MacKay & Stoyanova, 2017; Tapinos, 2013).

Conclusion

In conclusion, the term *intuitive logics* is a construct that was proposed in 1987 by Huss and Honton to bring together different practices and methodological ideas with common characteristics under the same thread. While the origins of the intuitive logics approach are traced back to the work of Herman Kahn in RAND Corporation and Pierre Wack at Shell, no evidence was found that either of these two people ever used the term intuitive logics to refer to their practice and methodology. It is important to note that today the term is not accepted by all members of the scenario planning community (and other communities), and some practitioners and authors still prefer terms like the Shell approach, the Pierre Wack approach, the GBN 2x2 matrix method, or a similar term, or adopt other less well-known terms like the driving forces method (e.g. Moriarty, 2012).

In addition to the above, there is wide consensus in the literature regarding two of the characteristics of the intuitive logics approach. These are often used to demarcate it from other approaches. Specifically, the two characteristics are:

- In the intuitive logics tradition, probability is considered irrelevant and misleading. Instead, intuitive logics scenarios explore what may plausibly happen.
- Intuitive logics scenarios are developed in a qualitative, intuitive manner and are primarily qualitative in nature.

Finally, the researcher argues that these two characteristics are quite broad and not sufficient to define and distinguish the intuitive logics approach from other traditions and schools of thought. Various authors in the closely related field of *future studies* have attempted to specify the defining characteristics or boundaries of their field by referring to *activities* (e.g. Hines & Gold, 2017). Thus, the lack of sufficiently specific characteristics in intuitive logics contributes to the formulation of the knowledge gap and research aims. This study aspires that by advancing the understanding of the practice and theory of scenario planning will contribute to specifying the defining characteristics of the field.

2.5 What is a scenario?

The literature indicates that there are a large number of different and sometimes contradicting definitions, descriptions and opinions about what a *scenario* is. This finding is not surprising; other scholars have also reported the existence of a large number of scenario definitions (e.g. Bradfield et al., 2005; Chermack & Lynham, 2002; Spaniol & Rowland 2018). For example, in a recent survey of the literature that was conducted with the purpose of identifying the available definitions of what a scenario is in the literature, Spaniol and Rowland (2018) report the existence of at least 77 different definitions. Similarly, Bradfield et al. noticed "*that the literature reveals a large number of different and at times conflicting definitions, characteristics, principles and methodological ideas about scenarios"* (2005, p. 796). The large number of ideas about what a scenario is (and about what scenario planning is as well) arise as one of the most frequently repeated criticisms of scenario planning. Millet (2003) stated that the large number of definitions and methods is a source of confusion and a major challenge for the development and legitimacy of the field that should be addressed. Millet's statement is often repeated by several scholars (e.g. Bradfield et al., 2005; Varum & Melo, 2010) It is not the purpose of this thesis to identify, present and discuss all the available ideas about what a scenario is. The table below presents a few key and indicative definitions and ideas about what a scenario is; two additional definitions offered by Kahn and Wiener (1967) and Spaniol and Rowland (2018) will be further presented and discussed.

Author(s)	Definitions/Descriptions/Ideas about what a scenario is
Porter	*"A scenario is an internally consistent view of what the future might turn out to be"* (Porter, 1985, p. 446)
Schwartz	*"A tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out"* (Schwartz, 1991, p. 4)
Schoemaker	*"focused descriptions of fundamentally different futures presented in coherent script-like or narrative fashion"* (Schoemaker, 1993, p. 195)
De Geus	*"simply an imaginative story about the future – a sketch of the 'lot of life' as it could develop from the present moment into the future"* (de Geus, 1997, p. 57)
Van der Heijden	*"internally consistent and challenging narrative descriptions of possible futures in this external world. They come in sets, representing the fact that there is considerable uncertainty in the future. The set is intended to be representative of the range of possible future developments and outcomes in the external world. They describe circumstances in the environment that could have a major impact on our business, but are essentially outside our own control"* (van der Heijden, 2005, p. 114)
Bradfield et al.	*"vehicles for exploration of the causes and outcomes of the interplay between forces in the contextual environment that drive the unfolding future in the context of the focal issue"* (Bradfield et al., 2015, p. 44)
Ramírez et al.	*'small bespoke set of structured conceptual systems of equally plausible future contexts, often presented as narrative descriptions, manufactured for someone and for a purpose, typically to provide inputs for further work*' (Ramírez et al., 2015, p. 71)

Table 2: Selected definitions, descriptions, and ideas about what a scenario is, as they appear in the literature.

The first definition of the term scenario in the literature

Several authors consider Herman Kahn as the person who introduced the term *scenario* in (what is known today as) the scenario planning literature and provided the earliest published definition of the term (e.g. Bradfield et al., 2005; Cooke, 2001; Ringland, 1998; Schwartz, 1991). Herman Kahn is largely regarded as the father of modern-day scenario planning and the origins of the intuitive logics approach are often traced back to his work

at RAND Corporation and the Hudson Institute. In the book *The Year 2000*, co-authored by Herman Kahn and Anthony Wiener (1967), scenarios are described as

> *Hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision-points. They answer two kinds of questions: (1) Precisely how might some hypothetical situation come about, step by step? And (2) What alternatives exist, for each actor, at each step, for preventing, diverting, or facilitating the process?* (Kahn & Wiener, 1967, p. 6)

This definition is considered by many scholars as the first published definition of the term *scenario.*

By closely examining the work of Kahn and Wiener (1967), the researcher argues that the two authors use the term *scenario* in a different sense than it is used today. Kahn and Wiener (1967) offer the concept of scenario in conjunction with the concepts of *standard world*, *canonical variations* and *systematic context*. To better understand these three concepts, one needs to consider the general approach that Kahn and Wiener describe in their book (p. 5-13). The standard world is fundamentally a surprise-free projection of long-term important trends, based on statistical extrapolation where possible, and is typically developed before anything else. Canonical variations are variations of the standard world, designed to raise certain issues and are developed after developing the standard world. It is fundamentally important to note that both the standard world and the canonical variations constitute the systematic context where the scenarios take place, or the end state. Having developed the canonical variations, scenarios can be developed by asking the question 'How might this canonical variation come about?'. In summary, in Kahn and Wiener's conceptualization, the standard world and canonical variations describe contexts or end states, and the scenarios are the pathways that lead to these end states. In modern day scenario planning literature, a scenario by definition includes both the end state and the pathway that leads to the end state (e.g. Burt et al., 2006; Fahey and Randall, 1998)

Finally, it is worth mentioning that many of the characteristics and important ideas that define the intuitive logics approach can be traced back to the work and methods of Herman Kahn. For example, Kahn offered strong arguments against the use

of quantitative forecasting and in favour of more qualitative approaches, especially in the context of potential discontinuity (See also Schnaars, 1987).

A synthesized definition

More recently, Spaniol and Rowland (2018) attempted to resolve the confusion that arises from the large number of definitions. The authors survey the intuitive logics literature, identify 77 different definitions of the term scenario and by analysing these definitions according to word frequency they create "*a shared definition composed of component parts of pre-existing definitions*" (p. 1). Spaniol and Rowland arrive at six properties that an entity needs to exhibit in order to be called a scenario. In summary, scenarios:

i) are future oriented,
ii) are about the external context, i.e. "*the part of the environment where we have little or no influence, but which impacts on us in a major way"* (van der Heijden, 2005, p. 114),
iii) should be perceived as plausible,
iv) should be in narrative form,
v) a scenario should be an element of a set of scenarios,
vi) the scenarios in the set should be comparatively different.

To the researcher's knowledge, the work of Spaniol and Rownland is the first systematic attempt to offer a scenario definition and resolve the confusion in the literature. It is important to note, however, that their work is limited in a number of ways. For example it does not take into account (and even conflicts with) the existing scenario planning practice (e.g. scenarios are not always in narrative form), does not take into account extreme casts (e.g. incremental and phantom scenarios), leads to logical inconsistencies (e.g. if someone develops multiple predictions would that be considered a scenario?) and does not include some most important elements (e.g. a scenario is expected to describe the end state and not be limited to the pathway). Most importantly, in the researcher's opinion, the definition of Spaniol and Rowland is incomplete and fails to capture the essence of what a scenario is, as it fails to capture the elements that

distinguish an intuitive logics scenario from descriptions of the future that also exhibit these six properties.

Conclusion

The review of the literature revealed a wide range of definitions regarding what a scenario is. In several cases, the definitions offered by authors contradict each other, as well as the current practice of scenario planning. In addition to that, it is not clear how the definitions offered were derived and no evidence of systematic examination of the subject was presented. The work of Spaniol and Rowland (2018) constitutes a notable exception to this, with some important limitations however, as discussed in the paragraph directly above. For these reasons, the researcher chose not to adopt any of the definitions offered in the literature. Instead, for the purpose of the present study, the researcher suggests defining the term scenario by using the core characteristics of the intuitive logics tradition that demarcate it from other approaches and traditions, as presented in section 2.4 of this thesis. Based on the above, the researcher developed and puts forward the following definition of scenario (within the intuitive logics tradition), which is adopted for the purposes of this study:

A scenario is *a story of how the future may plausibly unfold*. It is neither a forecast nor a prediction: scenarios attempt to answer a different question about the future (What may happen?) than forecasts and predictions (What will happen?) and adopt a different stance towards dealing with the future and uncertainty. Probability is also considered irrelevant. Intuitive logics scenarios are developed in a qualitative manner and primarily through the collective thought processes of the scenario team, rather than by using quantitative models. They are predominantly qualitative in nature.

2.6 What is scenario planning?

In a similar manner to the previous section on the concept of scenario, the review of the literature reveals an abundance of definitions, descriptions, and ideas about what scenario planning is. Again, it is not the purpose of this thesis to identify all such ideas as they appear in the literature and examine them. However, a selected few of such ideas are presented in Table 3 below.

Authors	Definitions/Descriptions/Ideas about what scenario planning is
Schoemaker	*"Scenario planning is a disciplined method for imagining possible futures that companies have applied to a great range of issues"* (Schoemaker, 1995, p. 25)
Ringland	*"that part of strategic planning which relates to the tools and technologies for managing the uncertainties of the future"* (Ringland, 1998, p. 2)
Peterson et al.	*"Scenario planning is a systemic method for thinking creatively about possible complex and uncertain futures"* (Peterson et al., 2003, p. 359)
Chermack & Lynham	*"Scenario planning is a process of positing several informed, plausible, and imagined alternative future environments in which decisions about the future may be played out for the purpose of changing current thinking, improving decision making, enhancing human and organization learning, and improving performance"* (Chermack & Lynham, 2002, p. 376)
Lindgren & Bandhold	*"a planning method used to deal with uncertainties in the future business environment"* (Lindgren & Bandhold, 2003, p. 26)
Othman	*"Scenario planning is the process for assessing future environment situations and describing the path from the present to the future"* (Othman, 2008, p. 262)
van der Heijden	*"a paradigmatic way of strategic thinking that acknowledges uncertainty with all the consequences this entails"* (van der Heijden, 2005, p. 19)
Miller & Waller	*"a process for structured thinking in which stories are created that bring together factual data and human insight to create scenario 'plots' exploring possible futures"* (Miller & Waller, 2003, p. 95)
Korte & Chermack	*"a means for making explicit the mental models supporting organizational reasoning and action"* (Korte & Chermack, 2007, p. 646)

Table 3: Selected definitions, descriptions, and ideas about what scenario planning is, as they appear in the literature.

For the purposes of this study, the researcher chose to adopt the definition of scenario planning offered by Chermack & Lunham (2002). The reason for selecting the specific definition is that it is the only definition developed through a systematic approach and with a clear rationale. Therefore, for the purposes of this study, scenario planning is defined as:

> *a process of positing several informed, plausible, and imagined alternative future environments in which decisions about the future may be played out for the purpose of changing current thinking, improving decision making, enhancing human and organization learning, and improving performance* (Chermack & Lunham, 2002, p. 376).

In the literature, scenario planning is largely described as either a tool, a technique, a method, a process, an activity, a methodology and/or a paradigmatic way of thinking. It is the researcher's argument, therefore, that to understand what scenario planning is, one needs to understand i) what someone is trying to achieve by engaging in scenario planning, and ii) the activities that enable achieving the purpose of engaging in scenario planning and the rules that guide these activities.

The researcher would like to highlight that, as scholars in the literature point out, scenario planning is generally not considered the same as developing scenarios. The development of scenarios is a central activity in scenario planning, but scenario planning is considered a more comprehensive activity than developing scenarios. Scenario planning typically involves developing the scenarios and using them to some end, typically to inform a decision of a kind. For example, Tapinos (2012) proposes that "*Scenario planning should be structured in two activities: (i) scenario development and (ii) strategy development"* (p. 339). Similarly, Bishop et al. (2007) attempt to clarify this confusion in the literature, i.e., equating the development of scenarios to scenario planning; they state: "*We suggest that 'scenario planning' has more to do with a complete foresight study, where scenario development is concerned more specifically with creating actual stories about the future. Scenario planning is a far more comprehensive activity, of which scenario development is one aspect*" (p.6). Similar statements can be found elsewhere, for example in Martelli (2001).

Finally, it is important to report the confusion that exists in the literature regarding terminology. Terms like scenario planning, scenario-based planning, scenario analysis and scenario thinking are used interchangeably and almost synonymously. While there are subtle differences between these terms, the usage of the term scenario planning as a tool to systematically explore the future has prevailed, even if no planning

is involved. The reason seems to be that the term scenario planning simply reflects the method's origins as a strategic planning tool. While some authors might choose not to use the term scenario planning but a different term, the term scenario planning is retained for the field and discipline.

2.7 Scenario planning is not forecasting

An argument that is often made by scholars and practitioners of the intuitive logics tradition is that scenario planning is not forecasting and similarly scenarios are not forecasts or multiple forecasts or a range of forecasts (e.g. Lindgren & Bandhold, 2003; Meristö 1989; Ramírez & Selin 2014; Schoemaker, 1991; van der Heijden 2005; Wilkinson 2009). Table 4 summarizes the differences between forecasts and scenarios according to Schoemaker (1982) as found in Meristo (1989).

Forecasts	Scenarios
• statistical summary of expert opinion	• mostly verbal descriptions of archetypical futures
• sources of uncertainty not specified	• focus on key variables and relationships
• efficient but impoverish summary of expertise	• information rich but inefficient summary
• directly usable as input to decision processes	• require further judgement and translation
• can be tested for accuracy in the long run	• hard to test; more a thinking tool
• assume it is useful and possible to predict the future	• assume future cannot be predicted, or it is dangerous to do so

Table 4: Summary of the differences between forecasts and scenarios according to Schoemaker (1982), as found in Meristo (1989).

Most importantly, intuitive logics scholars argue that scenario planning is not forecasting because these two approaches serve fundamentally different purposes and are underpinned by different and often conflicting assumptions about *uncertainty* and how to deal with it. For example, Ramírez and Selin (2014) and Wilkinson (2009) identify

two clashing cultures in the scenario community. Wilkinson (2009) playfully names these two communities the *Homo-Deductivist* and the *Homo-Constructivist*. Ramírez and Selin (2014) explain that what sets these two cultures apart is deeper perspectives on how to most effectively engage uncertain contexts. In the world of the Homo-deductivist, uncertainty is the result of limited knowledge, '*an enemy to be attacked, reduced, and ideally vanquished*' by '*collecting all that one can know'* (p. 60). The objective is to '*predict the future'*, probabilities are assigned to events and scenarios; effectiveness is measured in terms of accuracy of prediction. Forecasting belongs in the world of Homo-deductivist. On the contrary, in the world of the Homo-constructivist, uncertainty is intrinsic, it is recognized that there are "*irreducible limitations to knowing"* and the objective is to "*appreciate plausible futures*" (p. 60); probability is judged to be irrelevant and effectiveness cannot be judged in terms of accuracy of prediction. Intuitive logics scenario planning belongs in the world of Homo-constructivist. Ramírez and Selin (2014) also argue that the qualitative nature of intuitive logics is a direct manifestation of these underlying assumptions about the nature of uncertainty and what is the best way to deal with it.

2.8 Benefits of scenario planning

The review of the literature indicates a plethora of espoused benefits of scenario planning, but also a lack of clarity and agreement among the authors about what constitutes an effective scenario planning intervention, and a lack of systematic and rigorous empirical research regarding whether and how these benefits are achieved. Benefits of scenario planning are reported in the literature as aims, objectives, purposes, outcomes, functions of scenario planning and, in general, as reasons why a group of individuals or an organization might want to engage in scenario planning. In detail, some of the most commonly mentioned benefits of scenario planning, as they appear in the literature, are:

- To improve mental models. From the onset of scenario planning as a field and in many milestone publications, scholars and practitioners have advocated that scenario planning has the potential to change and improve the mental models of the decision makers, managers and policy makers (e.g. Hodgkinson & Wright, 2002; Schoemaker,

1993; Schwartz, 1991; van der Heijden 2005; Wack, 1985a; 1985b; Wright et al., 2013). According to this literature, scenario planning supposedly enables managers to re-align their microcosm with the outside world, challenges their bias, assumptions and perceptions, stretches their thinking, enables them to re-perceive and helps overcome strategic inertia. In some cases, it was argued that the transformation in the recipients' mental models is the real target of scenario planning and is as important as the development of scenarios themselves (e.g. Wack, 1985a). However, some authors argue that when scenario planning is performed unskilfully, it can actually have a negative impact on the mental models of the participants, creating new biases or amplifying new ones and anchoring and confining strategic thinking (e.g. Healey & Hodgkinson, 2008).

- To advance understanding of the external environment. Authors in the literature advocate that scenario planning has the potential to enhance understanding of the external environment. Wright et al. claim that one of the main objectives of scenario planning is to enhance understanding '*of the causal processes, connections and logical sequences underlying events — thus uncovering how a future state of the world may unfold*' (2013, p. 633). Varum and Melo (2010) report that a main benefit of scenario planning is helping to identify new issues and problems an organization may face in the future (2010). Scenario planning can also help managers and decision makers identify and better understand the critical uncertainties in the external environment and provides a structure for dealing with these (Bood & Postma, 1997; Wack, 1985a; Wright, 2013).

- To assist individual and organizational learning. Closely related to the benefits of improving mental models and advancing understanding, several authors have suggested that scenario planning has the potential to trigger, accelerate and otherwise improve individual and organizational learning (e.g. Burt & Chermack, 2008; de Geus, 1988; Schwartz, 1991; van der Heijden, 2005). In some cases, learning simply means to acquire new knowledge and new skills (e.g. Chermack, 2004), while in other cases, authors refer to much more complicated phenomena (e.g. Wright et al., 2013).

- To improve decision making. Several authors argue that scenario planning has the potential to lead to making better decisions, either by providing a test bed for decisions or by helping the managers make more informed decisions (e.g. Chermack, 2005; Porter, 1985; van der Heijden, 2005; Varum & Melo, 2010).

- To improve organizational performance. On some occasions, authors in the literature argue that an organization that systematically engages in scenario planning will enjoy better performance (financial or not) due to one or more of the above-mentioned benefits (e.g. Chermack, 2005; Phelps et al., 2001; Varum & Melo, 2010).

Other noteworthy benefits of scenario planning include the development of social capital (Lang & Ramírez, 2017), and the ability of scenarios to integrate both qualitative and quantitative data (Huss, 1988). It is important to note that these benefits are not mutually exclusive, and, in one case, an author has linked learning, changes in mental models, decision making and improved performance into a theory of scenario planning (Chermack, 2005).

Conclusion

In conclusion, the review of the literature revealed an abundance of claims regarding the espoused benefits of scenario planning. After careful examination of these claims however, it becomes evident that little empirical research has been conducted that examines whether scenario planning fulfils its espoused benefits, through what actions and practices, and under what conditions. In addition to this, in the vast majority of published literature, these benefits are not clearly and unambiguously defined. The lack of conceptual clarity and the lack of empirical research have been reported by other authors as well and constitute a common criticism of scenario planning (e.g. Balarezo & Nielsen, 2016). It is important to note that the work of Glick et al. (2012), Phadnis et al. (2015), Phelps et al., (2001) and Schoemaker (1993) constitute notable examples of empirical research. These research gaps, and specifically the lack of knowledge regarding the practices that enable the fulfilment of the scenario planning benefits, contribute to the formulation of the knowledge gap and research aims of this study.

2.9 The practice and method(s) of scenario planning

The review of the literature indicates that the practice of scenario planning is a topic under-researched in multiple ways. The researcher argues that what Whaley describes in his following statement fully applies to the current status of knowledge concerning the practice of scenario planning:

> *From near 40 years involvement in planning and scenarios, seeing practitioners' sales literature and their presentations at conferences and seminars I have attended or organised, in general they are vague about where their scenarios come from. They allude to a process, people working behind the scenes, giving the impression of expertise. But hard facts of what is done to create the scenarios, what data is processed and how, is not generally set out. No theory can be applied or arise from this in the hard science context-where the concept of 'showing your workings' is as important as the results they lead to* (Whaley, 2008, p. 310)

What we know about the practice of scenario planning is reported in the literature (peer-reviewed or not) primarily in two forms: firstly, descriptions of actual scenario planning projects, and secondly, methods and processes for developing scenarios, most notably the GBN 2x2 matrix-based process. These methods and processes serve as both a description of the basic activities, the fundamental structure of a scenario planning project, but also as a normative guide, a prescription of how to develop scenarios. For example, Postma and Liebl (2005) claim that the basic activities of a scenario planning project follow a basic structure which is a variation of the GBN 2x2 matrix process. The descriptions of actual scenario planning projects in the literature, the scenario planning methodology and the GBN 2x2 matrix process are critically examined in detail below.

Descriptions of actual scenario planning projects

A significant number of papers, most typically single or multiple case studies, refer to actual scenario planning projects. In each case, the authors provide their accounts and a brief description of the scenario planning project(s) (e.g. Bowman et al., 2013; Bradfield & El-Sayed, 2009; Burt et al., 2006; Burt, 2011; Cairns et al. 2013; Cairns et al., 2017; Hodgkinson & Wright, 2002; MacKay & Stoyanova, 2017; Moyer, 1996; O'Brien & Meadows, 2013; Ramírez et al., 2013; Tapinos, 2013; Wilkinson & Elahi, 2003; Wright et

al., 2008). However, the practice of scenario planning is reported in an incidental, anecdotal manner and is neither the focus nor the product of systematic and rigorous research. Similar arguments are made by other authors as well, who raise concerns over the credibility and rigour of these descriptions and the quality of the scenario planning literature in general (e.g. Hodgkinson & Healey, 2008; Tapinos, 2013). As Hodgkinson and Healey observe, "*since the evidence base primarily comprises anecdotal case accounts authored by practitioners, it has been more effective in legitimizing and justifying scenario planning than in scrutinizing rigorously the behavioural conditions and causal mechanisms that might enable scenario-based techniques to yield positive outcomes*" (2008, p. 437). Finally, many questions still remain unanswered about how to perform crucial elements of the scenario development process, such as how to select the two axes of the 2x2 matrix (Phadnis et al., 2014).

Scenario development methodology

The review of the literature indicates that the intuitive logics methodology is significantly under-researched in multiple ways. A claim that is very frequently repeated in the literature is that the intuitive logics tradition suffers from what Martelli describes as '*methodological chaos*' (2001). Martelli claims that the "*theories, principles and rules for building with scenarios … are vastly different and even furiously conflicting with each other*" (2001, p. 5). In addition to that, Martelli states that there is no "*set of theories, principles and practical rules commonly accepted by at least the vast majority of the theoreticians and of the practitioners.*" (2001, p. 5). Martelli attributes these alleged methodological shortcomings to the claim that there are "*almost as many ways of building and planning with scenarios as there are practitioners*" (p. 6). While Martelli refers mainly to the existence of the four different methodologies to develop scenarios (namely intuitive logics, trend-impact analysis, cross-impact analysis and morphological analysis), his statements were adopted by intuitive logics scholars who adapted them to refer to the intuitive logics methodology. For example, Bradfield et al. (2005) mention "*when it comes to the intuitive logics model, a large part of the 'methodological chaos' referred to in the introduction arises from the observation that there are almost as many ways of developing scenarios as there are practitioners in the field*" (p. 800). In a similar manner, Randt (2015) notes that "*A plethora of scenario development models and techniques… has been created within the Intuitive Logics Schoo*l" (p. 14), quoting the work of Bradfield et al. (2005) and

Martelli (2001). Claims about the existence of a methodological chaos or similar claims are very frequently repeated by intuitive logics authors, although it is not always clear whether they refer to within the intuitive logics approach or across the many different methods and approaches (e.g. Amer et al., 2013; Millet 2003; Piirainen & Lindqvist, 2010; Ramírez et al., 2015; Stewart 2008; Varum & Melo, 2010). In addition to the above, and as other scholars have reported, there are many methodological ideas in the literature but "*many of which are arcane and impractical, most of which have never been fairly tested"* (Schnaars, 1987, p. 105). Finally, some authors have argued that the stylized methods and processes that appear in the literature do not reflect what is actually happening in practice. For example, Phadnis et al. state '*very little has been published about the actual methods used for developing scenarios in practice'* (2014, p. 124).

A scenario planning methodology would most probably consist of a system of principles (theories, principles, axioms, practical rules) that would guide and inform the practice of scenario planning with the purpose of designing and implementing effective planning interventions. As it is also suggested by Martelli (2001), it might be meaningful to systematically examine and/or develop a scenario methodology that belongs to at least some majority of the scenario planning community. Such research is currently missing.

A 'standard' process to develop scenarios

One of the most important publications in the intuitive logics literature is the book 'The Art of the Long View' by Peter Schwartz (1991). One of the reasons why this book received so much attention and achieved a prominent status was an eight-step process for developing scenarios, which was included in the Appendix. In detail, the steps are:

Step One: Identify Focal Issue or Decision
Step Two: Key Forces in the Local Environment
Step Three: Driving Forces
Step Four: Rank by Importance and Uncertainty
Step Five: Selecting Scenario Logics
Step Six: Fleshing Out the Scenarios
Step Seven: Implications
Step Eight: Selection of Leading Indicators and Signposts

The 2x2 matrix-based process is most often described as the 'standard' approach to developing scenarios. Authors in the literature typically claim that the 2x2 matrix method is the most frequently used approach to develop scenarios, or "*the best overall guide to the process*" (Ringland, 1998, p. 81-82) or the '*gold standard*' (e.g. Bishop, 2007; Millett, 2007) or even go as far as to equate the intuitive logics approach with the 2x2 matrix method (e.g. Bradfield 2016; Derbyshire & Giovannetti 2017; Ramírez & Selin 2014; Wright et al. 2013). For example, Bradfield, Derbyshire and Wright (2016) present an eight-stage process (which is actually the GBN 2x2 matrix-based process (Table 1 in their paper) after stating that:

> *While there are many different approaches to scenario construction, Postma and Liebl (2005) have shown the predominant approach to be that known as 'Intuitive Logics' (IL). In line with Ramírez and Wilkinson (2014), IL is often referred to as the 'standard' approach to scenario planning. As recently outlined by Wright et al. (2013, p. 634), this standard approach follows a sequence of eight stages, as summarized in Table 1* (Bradfield et al., 2016, p.61)

Due to the prominent status that the GBN 2x2 matrix-based process holds in the literature and since many scholars describe it as the 'standard approach' to develop scenarios, or as equivalent to the intuitive logics approach, the researcher will consider the GBN process as the reference process against which the findings of this research will be compared.

The researcher followed the references that Bradfield et al. (2016) cite. Postma and Liebl (2005) claim that "*although there is no real standardized process and many differences can be observed between the various approaches within this tradition* [Shell tradition]*, in general, they show some basic structure"* (p. 163) and then present a 12 stage variation of essentially the GBN 2x2 matrix approach.

The above statements, and other similar statements are often repeated by several leading authors in the literature and might give the impression that the claim is based on sound premises. However, by carefully examining the referenced work and following the trail of references, it becomes obvious that such claims are not supported by sufficient

evidence. To support their statements, Postma and Liebl (2005) refer to their own reviews of the literature. Following the references that the authors cite, it becomes apparent that their claims are not soundly supported. The alleged dominance of the 2x2 matrix remains alleged and subject to further investigation.

As also stated earlier, the 2x2 matrix process is presented both as a description of the basic activities and the basic structure of a scenario planning project, but also as a method, a normative guide, a prescription of how to develop scenarios. However, in the researcher's opinion, the 2x2 matrix process does not explain how the expected outcomes of scenario planning are achieved (e.g. improved cognition), does not sufficiently inform the design and implementation of scenario planning interventions and does not adequately describe the important activities of a scenario planning project.

Conclusion

In conclusion, the review of the literature revealed the existence of several knowledge gaps related to the practice of scenario planning. Firstly, the researcher raises concerns regarding the *rigorousness of inquiry* in scenario planning and by extension the *credibility of current 'knowledge'*. Specifically, there is lack of emphasis on the research methodology adopted in individual papers and claims are often made in an anecdotal manner. This statement is supported by other authors in the literature who have strongly criticized the quality of inquiry in scenario planning (e.g., Hodgkinson & Healey, 2008; Rowland & Spaniol, 2020; Tapinos, 2013).

Secondly, the researcher argues that the literature does not cover fundamental elements and aspects of the practice of scenario planning. For example, there is wide consensus in the literature that a most important objective in scenario planning (if not the raison d'être) is to change the mental models of the audience (as examined in section 2.8 – benefits of scenario planning). However, after close examination of the descriptions of practice of scenario planning in the literature, it remains elusive and unclear how this objective is achieved, through which activities and actions. At the same time, the 2x2 matrix-based method is often promoted as the 'standard approach' to developing scenarios but provides no information about how this might change the mental models of the audience. The existence of this gap is supported by other authors as well who have made similar statements (e.g., Phadnis et al., 2014; Whaley, 2008).

The identification of these practice-related knowledge gaps signals the need for more research that will examine the practice of scenario planning in a systematic, academically rigorous, and comprehensive manner. To address these knowledge gaps, the researcher aspires to advance the practice and methodology of scenario planning by systematically examining it in an academically rigorous and comprehensive manner. This constitutes one of the objectives of this study.

2.10 The theory of scenario planning

One of the most frequently repeated criticisms of scenario planning in the literature is that scenario planning has limited theoretical foundations and/or there is no theory of scenario planning. For example, Chermack (2005) writes:

> *With the practice of scenario planning set firmly in place and continuing to develop rapidly, a body of research and theory that describes and explains the phenomenon does not exist. The problem is that there has been inadequate research and theory development to support the fast growing practice of scenario planning* (Chermack, 2005, p. 60)

More recently, Phadnis et al. (2014) state:

> *The ILS* [intuitive logics school] *outlines a high-level scenario development process, but without a theoretical basis or prescriptions for executing different process steps. The lack of theoretical grounding has led to a proliferation of methods for developing scenarios, without any basis for comparing them* (Phadnis et al., 2014, p. 122).

Very similar statements can also be found throughout the literature (e.g. Balerazo & Nielsen 2017; Bradfield, 2008; Burt, 2010; Chermack, 2004; Derbyshire, 2017; Godet, 1990; Goodwin & Wright, 2001; Jungermann, 1985; Moriarty, 2012; Phadnis et al., 2014; Tapinos, 2013; Wilkinson, 2009; Wright et al., 2013). According to many authors, the reason for this situation is that scenario planning is a practitioner-led field, and the focus has been on developing new techniques and methods and applying them, without necessarily grounding such techniques on theoretical principles and significantly

neglecting theoretical research and empirical validation (e.g. Godet, 1990; Goodwin & Wright, 2001; Wilkinson, 2009; Wright et al., 2013).

The lack of theoretical foundations is considered important by many authors for a variety of reasons. Chermack (2004) states that "*the articulation of theoretical foundations is critical to the development and maturation of any field, discipline, or process*" and argues that scenario planning needs strong theoretical foundations if it is to become a discipline or professional field of practice. Wilkinson (2009) argues that theory is needed for scenario to be recognized as an intellectually rigorous activity in public policy and strategy development. Derbyshire (2017) argues that the lack of theory has led to a proliferation of methods that are used to develop scenarios and hinders empirical work. Phadnis et al. (2014, p. 122) state that the lack of theoretical foundations is not a '*mere academic inconvenience'* but it is expected that such foundations would provide guidance for developing scenarios, would allow the theoretical evaluation of scenario practices and would offer methodological credibility.

An important observation that the researcher makes from reviewing the literature is that the theoretical foundations of scenario planning that many scholars refer to and seek after are tightly connected to the practice of scenario planning. The researcher argues that scholars of scenario planning report the lack of and seek after a theory of scenario planning that would enable the design and implementation of effective scenario planning interventions and explain why and how scenario planning is effective. Evidence from this comes from many sources. Firstly, the vast majority of the authors who criticize the lack of theory in scenario planning refer to the lack of theories that underpin the scenario techniques, methods or practice in general. In addition to the statements by Chermack (2004) and Phadnis et al. (2014) that the researcher presented in the beginning of this section, another example comes from Bradfield (2008) who states that "*there appears to be no solid theoretically based foundation underpinning scenario techniques*" (p. 198-199). Many similar statements can be found throughout the literature. Secondly, Derbyshire (2017) suggests that a theory of scenario planning '*would likely consist of a set of generally agreed-upon over-arching principles that guide the implementation of scenario planning as it is tailored to suit the particular context in which it is applied*' (p.77-78). The same focus on using existing theories or developing new

theories that would allow the design of more effective interventions can be found in the closely related field of foresight (e.g. Piirainen & Gonzalez, 2015). Finally, Hodgkinson and Healey (2008) suggest that scenario planners should adopt well-established bodies of basic theory and research with the purpose of informing the design of robust scenario planning interventions. In other words, scholars in the scenario planning literature call for knowledge (principles, axioms, theories, methodological ideas) that would enable the design and implementation of effective scenario planning interventions. The researcher identifies this call for knowledge (principles, axioms, theories, methodological ideas) that would enable the design and implementation of effective scenario planning interventions as a knowledge gap.

Despite the numerous articles that attempt to provide a theoretical underpinning to scenario planning (as mentioned directly above), the researcher argues that the objective of developing a theoretical foundation that would '*guide the implementation of scenario planning as it is tailored to suit the particular context in which it is applied*' as Derbyshire and other suggest (2017, p.77-78), has not yet been achieved. While the current theoretical work may be methodologically rigorous, the knowledge is not in a form that can be readily applied to practice, inform the actions of practitioners, and help them solve the practical challenges they are facing. In other words, current theoretical work is not sufficiently relevant to practice and there exists a gap between theory and practice. The lack of relevance becomes immediately obvious if one contrasts the existing theoretical work, with the actions that scenario planning practitioners take and the challenges they face when developing scenarios.

To provide an example, Chermak (2005) has developed and put forward a theory of scenario planning. An overview of Chermack's theory and its core elements can be seen in Figure 2. Given that i) one of the important objectives of scenario planning according to the literature (section 2.8) is to challenge the mental models of the participants, and ii) the central role mental model change plays in Chermack's theory, one would expect that his theory would inform fundamental questions such as "How can/should a scenario planning practitioner change the mental models of the participants?" or "What is an appropriate mental model change?". However, Chermack's theory does not provide even partial answers to these or similar questions. His theory also fails to inform other

important issues that have received considerable attention in the literature such as "How should one select the two axes and construct the 2x2 matrix?" or "How should driving forces be identified?".

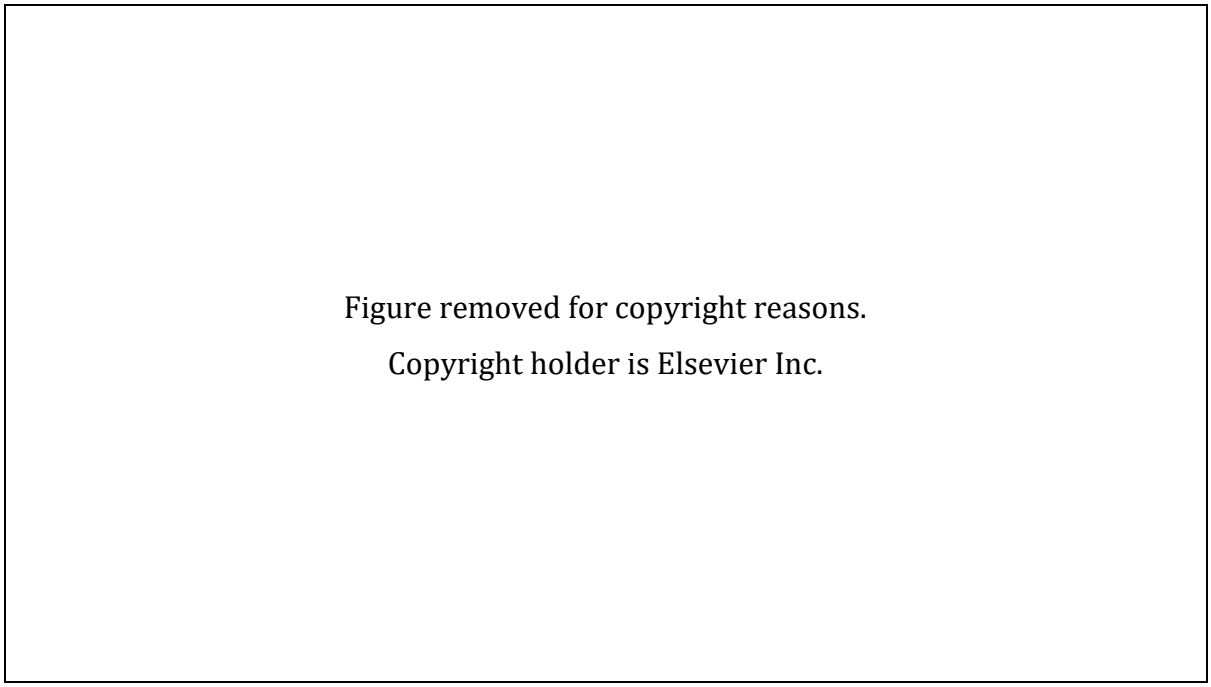

Figure 2: The central elements of a theory of scenario planning, developed by Chermack, and as found in his original article (2005; p. 64).

According to leading scholars of practice theory, theories that fail to capture the essential elements of the *logic of practice,* (i.e., the logic that underlies practice as experienced by the actor/practitioner) are not relevant to practice (Bourdieu, 1990; Feldman & Worline, 2016; Sanberg & Tsoukas, 2011). Eikeland and Nicolini argue that to develop theory that is relevant to practice, '*effort should be concentrated on a type of theory that helps practitioners articulate what they already do, and therefore somehow know*' (2011, p.169). In addition to that, research should aim at '*pursuing knowledge and understanding from within the knowers' own practice, rather than a segregated position outside'* (Eikeland & Nicolini, 2011; p.168). However, Chermack's theory and the significant majority of the theoretical efforts mentioned above are developed from a segregated position outside the actor's own practice and they do not capture fundamental aspects of the experienced logic of practice. Finally, almost all the theoretical efforts mentioned above attempt to impose a pre-existing theory to scenario planning (Chermack's theory described above is an exception to this). As a result, important details

and the richness of practice are not captured. Sandberg and Tsoukas (2011) argue that theories that emerge from practice are more reflective of the richness and details of practice and thus more relevant to practice, as compared to imposing pre-existing theories.

The gap between theory and practice is not a phenomenon unique to scenario planning but it is a significant and persistent issue that has received strong attention in organization and management science and in applied sciences in general (Gulati, 2007; Makrides, 2007; McGahan, 2007; Tushman & O'Reilly, 2007; Van De Ven & Johnson, 2006; Vermeulen, 2005). It is also sometimes referred to as the rigor relevance debate. Leading scholars in organization and management scholarship have long insisted that research needs to be useful to managers and practitioners and have urged to '*bridge the gap between the formal knowledge produced by management scholars and the applied knowledge practitioners need*' (Sandberg & Tsoukas, 2011; p. 338).

Conclusion

In conclusion, the review of the literature revealed the existence of a considerable number of articles that attempt to provide a theoretical underpinning to scenario planning. Despite these contributions to theory, a shared foundational theory has yet to emerge. In addition to this, the researcher further argues that current theoretical efforts do not sufficiently inform the actions of practitioners, i.e., are not relevant to practice. Evidence for the lack of theory that is relevant to practice also comes from multiple authors in the literature who called for a theory of scenario planning that would guide its implementation. Having identified this gap in the literature, further research is needed to advance the theory of scenario planning in a way that is both academically rigorous and relevant to practitioners. This gap informs the primary aim of this study.

2.11 The knowledge gap

In total, more than 250 journal articles and books related to intuitive logics, the broader field of scenario planning and other related fields (e.g. Futures Studies, Foresight) have been critically reviewed. The researcher identified in the literature three interrelated areas that have been overlooked and are under-researched, lack empirical support

and/or are the source of confusion: the theory, the methodology and the practice of scenario planning. Each of these three were described in full detail in sections 2.9 and 2.10 directly above. The common thread that underlies these three knowledge gap areas is the lack of an adequate theoretical and methodological foundation of scenario planning, i.e., a system of theories, concepts, principles, and practical rules, that would inform and guide the practice of scenario planning, and which is supported by systematic and rigorous academic research. There is a clear gap between theory and practice in scenario planning and lack of knowledge that is both scholarly rigorous and relevant to practitioners.

The knowledge gap that this research aspires to contribute to is:

> *There is currently no adequate theoretical and methodological foundation underlying scenario planning.*

Before formally articulating and presenting the research question, the researcher refers to practice theory and introduces the concept of *practice* and the basic principles of practice theory.

2.12 A primer on Practice Theory

Practice theory has its roots in the work of social scientists and philosophers like Bourdieu, Giddens, Foucault, Taylor, Weber, Wittgenstein, with many other authors also worth mentioning, e.g. Ortner, Reckwitz, Schatzki. Rather than a unified theory, practice theory is a field with many strands and traditions. The term practice theory is used to refer to a set of concepts, principles and ideas that focuses on and prioritizes human actions and activities in the study of social life. While the term *practice theory* and other related terms such as *practice based view* are well established in the literature, there is no definitive way of demarcating what qualifies as one and there are at least different ways of theorizing practice (Nicolini, 2012; Schatzki, 2018). According to Schatzki (2012, 2018) there are three fundamental features or principles common among the various

strands and traditions of theories of practice, also evident in the work of other authors as well (e.g. Feldman & Orlikowski, 2011; Feldman & Worline, 2016; Gherardi, 2006; Nicolini, 2012; Ortner, 1984; Reckwitz, 2002; Schatzki, 1996, 2001).

Firstly, and as also briefly stated above, exponents of practice theory advocate that social phenomena '*must be understood as forms of, or as rooted in … the organised activities of multiple people*' (Schatzki, 2012, p. 13). In other words, the focus of study, both empirically and theoretically, should be the actions of individuals. The reason is that social life (e.g. identity, language, meaning, power, institutions, transformation) takes meaning on, is a form of, or occurs in the everyday actions of multiple people (Feldman & Worline, 2016; Giddens, 1984). One example of the application of this principle comes from the strategy-as-practice field. At the core of the strategy-as-practice field lies the premise that strategy is something that people do rather than something that organizations have. Therefore, in the words of one of the leading authors of the field, '*Strategy-as-practice (s-as-p) as a research topic is concerned with the doing of strategy; who does it, what they do, how they do it, what they use, and what implications this has for shaping strategy*' (Jarzabkowski & Spee, 2009, p. 69). Similar statements can be found in the work of other authors as well, e.g. Whittington (2006) and Golsorkhi et al. (2015).

Secondly, there is no commonly accepted definition of what a practice is, and the concept is defined in different ways in the different strands or theories of practices, with the authors including in their definitions what is important in the subject of study. Many important scholars (e.g. Marx, Bordieu, Heidegger and Garfinkel) also do not explicitly define practices. However, Schatzki (2018) argues that common among these many definitions are three fundamental characteristics. A practice is not something that one person could enact, and it is carried on by multiple people. Practices also have an internal structure, they are organized constellations of people's activities, doings and sayings. There is also an external structure, practices connect with other practices and any practice is embedded in a web of practices. Nicolini (2012) argues that instead of picking one particular definition of practice, it is appropriate to embrace the plurality and richness of the different definitions, a position that the researcher adopts.

In relation to defining the concept of practice scholars often distinguish between two aspects of a practice, closely related to the concepts of structure and agency of Giddens (1984). Schatzki (2012) argues that a practice has two components, structure and action. In the field of organizational studies and in a milestone paper, Feldman and Penland (2003) propose the concept of organization routines as the source of stability and change in organizations. In their definition of the concept, an organizational routine has two aspects, the performative aspect (specific actions, at specific times, by specific people) and the ostensive aspect (the ideal form; guides, accounts for and is used to refer to the actions that people take). Similarly, in the field of strategy-as-practice, scholars distinguish between practice and praxis (e.g. Johnson et al. 2007; Whittington, 2006).

Finally, practice theory rejects and provides a remedy against irreducible dualisms such as objective/subjective, and structure/agency. Instead, practice theory favours dualities which are inseparable in practice (Bourdieu, 1990; Feldman & Orlikowski, 2011; Giddens, 1984; Nicolini, 2012). This for example is evident in the case of organizational routines as by Feldmand and Pentland (2003) as described above. Feldman and Pentland described the ostensive and the performative as inseparable aspects of the routine, both of which are necessary for the routine to exist.

During the last two decades, there has been a surge of interest in practice theory and its application in the study of strategy (Jarzabkowski & Spee, 2009; Johnshon et al., 2007; Whittington, 2006), organizational routines (Feldman & Pentland, 2003; Parmigiani & Howard-Grenville, 2011; Pentland & Hærem, 2015), use of technology (Levina & Vaast, 2006; Orlikowski, 2000; Suchman et al., 1999), communities of practice (Brown & Duguid, 2001; Gherardi & Strati, 2012) and others as well, giving rise to what Corradi & Verzelloni (2010) call the bandwagon of practice-based studies. Authors and scholars have used the terms practice-based view, practice-based perspective, and practice lens among others, to refer to the empirical and theoretical focus in how people act in the study of social phenomena such as those listed above.

2.13 The research question

The knowledge gap that this study aspires to contribute to, as formulated in section 2.11 of this thesis, is:

> *There is currently no adequate theoretical and methodological foundation underlying scenario planning.*

To contribute to addressing this knowledge gap, this research will systematically and deeply examine the practice of scenario planning, i.e., what scenario planning experts do when they examine the future and why. The intention is to generate technical concepts and theoretical statements based on the everyday concepts and interpretations of the scenario planning experts. More formally, the research aims, and objectives of this thesis are:

> *To advance the understanding of the practice and methodology of scenario planning.*
>
> *To build a foundation of principles and theory of scenario planning from that better understanding of practice.*

Finally, based on the knowledge gaps that the researcher identified in the literature and in line with the objectives of this research, the question that guides this study and that the researcher will attempt to answer is:

> *What practices do intuitive logics scenario planning experts enact when exploring the future?*

Chapter 3: Research design

3.1 Introduction

In this chapter, the researcher presents the research approach that he followed in order to fulfil the research objectives and answer the research question. The research objectives of this research, as established in the introduction chapter are:

> *To advance the understanding of the practice and methodology of scenario planning,*
>
> *To build a foundation of principles and theory of scenario planning from that better understanding of practice.*

The research question, as established in the literature review chapter is:

> *What practices do intuitive logics scenario planning experts enact when exploring the future?*

The aforementioned open-ended research question and the two research objectives express the exploratory nature of this research, since the aim is to address the nascent state of prior systematic research. The researcher adopted *interpretivism* as the theoretical paradigm to underpin this inquiry and sought out to uncover the meanings and motivations that scenario planning experts attach to their actions. Multiple cases of scenario planning experts were studied, and data were collected using in-depth interviews. The researcher analysed the data using thematic analysis (Braun & Clarke, 2006). Each of these choices is described and justified in detail in this chapter. This is followed by a discussion of the quality criteria that were upheld in this study in order to ensure rigorous results.

3.2 Theoretical paradigm

Before describing the research strategy and methods that the researcher used to answer the research question and fulfil the aim of this research, it is important to be explicit about the *theoretical paradigm* (also referred to as *theoretical perspective* or *research paradigm)* that the researcher adopted and underpins this inquiry. Burrell and Morgan define paradigms as "*the very basic meta-theoretical assumptions which underwrite the frame of reference, mode of theorising and modus operandi of the social theorists who operate within them"* (1979, p.23). Similarly, Guba & Lincoln define a paradigm as "*the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways"* (1994, p. 105). Most importantly, assumptions about the nature of reality and the nature and justification of knowledge have strong implications on the research strategy and methods that can be used to investigate a phenomenon of interest; these assumptions ground the logic of inquiry and demarcate the limits of what is to be considered legitimate inquiry (Burrell & Morgan, 1979; Crotty, 1998; Guba & Lincoln, 1994; Guba et al., 2017). As Guba and Lincoln eloquently remarked, "*questions of method are secondary to questions of paradigm*" (p. 105) or in the words of Crotty "*different ways of viewing the world shape different ways of researching the world"* (1998, p. 66). Major and noteworthy paradigms include positivism, post-positivism, interpretivism/constructivism, critical realism, pragmatism and critical inquiry (Blaikie, 2009; Bryman, 2012; Creswell, 2007; Crotty 1998; Easterby-Smith et al. 2015; Gephart, 2004; Guba et al., 2017; Saunders et al. 2012).

The theoretical paradigm that the researcher adopted and underpins this research is *interpretivism*. Following Guba & Lincoln (1994), the researcher assumes a relativist ontology and a transactional and subjectivist epistemology. The aim of interpretive inquiry is to "*to understand the subjective experience of individuals*" (Burrell & Morgan, 1979, p. 253). Interpretive inquiry "*uncovers, describes, and theoretically interprets actual meanings that people use in real settings"* (Gephart, 2004, p.457). The origins of interpretivism can be traced back to the 19th century in Germany and the work of philosophers Max Weber, Wilhelm Dilthey, and Edmund Husserl among others (Constantino, 2008, Crotty, 1998). Interpretivism rose as a response to the paradigm of positivism that was dominant during the 19th century and for that reason it is also

referred to as *anti-positivism*. Major intellectual traditions within interpretivism include *hermeneutics*, *phenomenology*, and *symbolic interactionism*.

Philosophers and proponents of interpretivism argue that inquiry in human and social sciences should be fundamentally different than inquiry in natural sciences in terms of purpose, nature, and method; inquiry in human sciences should study the subjective experience of individuals. For example, Max Weber, who is considered by many as one of the foundational fathers of interpretivism, defined sociology as the science that concerns itself with studying the subjective meaning that people attach to their actions as well as their motivations (Weber, 1921/1978). It is important to note that Weber distinguished between meaningful action from human and social processes and phenomena that are devoid of meaning. The main reason offered by proponents of interpretivism as to why inquiry in human and social sciences should be fundamentally different than inquiry in natural sciences is that the subject matter of human and social sciences is different than the subject matter of natural sciences (Crotty, 1998). In the words of Schwandt (2000) "*what distinguishes human (social) action from the movement of physical objects is that the former is inherently meaningful*" (p.191). Occurrence of events and regularities in natural phenomena is *explained in terms of causes*, impersonal natural forces, factors, and mechanisms; occurrence of events and regularities in human sciences is *understood in terms of reasons*, subjective meaning, and human agency (Schwandt, 2007). These two forms of explanation, i.e. causal explanation and reason understanding, reflect two long standing traditions in German scholarship, known as *Erklären* (explanation) and *Verstehen* (understanding) (Blaikie, 2009). Finally, the study of natural phenomena is predominantly interested in producing law-like generalizations (*nomothetic*) while the study of human and social sciences focuses on understanding isolated individual phenomena (*idiographic*) (Crotty, 1998).

The researcher's choice to adopt interpretivism as the theoretical paradigm that underpins this research was rooted in the aims and objectives of this research, i.e. to advance our understanding of the existing scenario planning practice and to develop a foundation of principles and theory of scenario planning. It is the researcher's argument that in order to understand scenario planning, one needs to first and foremost examine scenario planning from the inside, from the perspective of the scenario planning expert,

to examine reality as constructed by scenario planning experts. In other words, in order to understand scenario planning, it is of foremost importance to examine the meanings and motivations that scenario planning experts attach to the practice of scenario planning. Thus, this research sought out to uncover the subjective meaning and motivations that scenario planning practitioners attach to their practices when they examine the future.

3.3 Research strategy

In order to gain a deep understanding of the meaning and motivations that scenario planning experts attach to their actions, the researcher studied multiple cases of scenario planning experts or in other words adopted a multiple case study strategy (Eisenhardt, 1989; Yin 2014). Robert Yin, who is considered by many as a leading scholar in case study research, defines a case study as follows:

"*A case study is an empirical inquiry that investigates a contemporary phenomenon (the 'case') in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident*" (Yin, 2014, p.16).

One of the defining characteristics of case study research (if not the central defining characteristic) is the emphasis on in-depth investigation of a case (or a small number of cases) (Robson & McCartan, 2016). A case can be a situation, a setting, an event, an organization, an individual person or a group of people. In this research the case was the individual scenario planning expert. However, the topic of inquiry were not the specific individuals per se, but rather the scenario planning practices of the scenario planning experts. Study of a case was undertaken in order to gain a deep understanding of the practice of scenario planning of that particular expert.

The logic that underpins the study of multiple cases of scenario planning experts in this research is *replication*, as suggested and described by multiple proponents of case study research (e.g. Creswell, 2007; Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Robson & McCartan, 2016; Yin 2014). Replication logic is analogous to conducting multiple experiments: each case is considered as a single experiment and cases are

selected with the intention of either replicating existing results or to uncover contrasting results, expected for anticipable reasons. In the words of Robert Yin, "*upon uncovering a significant finding from a single experiment, an ensuing and pressing priority would be to replicate this finding by conducting a second, third and even more experiments"* (2014, p. 57). Adopting a replication logic is in contrast with *sampling logic* (commonly used e.g. in surveys) where the objective is to generalize the findings to a larger population by examining a (supposedly) representative sample of the population.

3.4 Case selection

This research sought to systematically examine the scenario planning practices of experts of the intuitive logics school of thought. In the literature review chapter, the researcher argued that the question regarding the defining characteristics of the intuitive logics approach remains unsettled, at least at a conceptual level. However, there is wide consensus among scholars about one core characteristic of the intuitive logics school of thought: the intuitive logics approach emerged at Shell and GBN and was practiced by scenario planning experts from those two organizations. For that reason, a criterion for inviting a scenario planning expert to participate in this study was to be strongly associated with (employed by) either one of those two organizations. In total, this study examined the practices of nine scenario planning experts: four of the participants were primarily associated with Royal Dutch/Shell, three of the participants were primarily associated with GBN and two participants were associated with both Shell and GBN. All participants were directly employed by either Shell or GBN at some point in the past. However, at the time of writing, none of them was directly employed by either Shell or GBN and most worked as independent consultants. The primary association of each participant can be seen in Table 5 below.

Participant	Primary association
Participant #1	Shell
Participant #2	GBN
Participant #3	Shell
Participant #4	Both

Participant #5	Shell
Participant #6	Shell
Participant #7	Both
Participant #8	GBN
Participant #9	GBN

Table 5: The primary association of each participant of this study.

The participants of this research were not selected randomly but based on what many scholars refer to as *purposive sampling* (e.g. Miles, Huberman & Saldaña, 2014; Saunders et al., 2012). It is important to note that the term sampling does not imply a form of statistical generalization and for that reason some authors recommend against using the specific terminology (e.g. Yin, 2014). The researcher used his best judgement to select cases that are information rich and enable answering the research question in a most effective way. For example, in the beginning of this research, the researcher sought to include scenario planning experts from both Shell and GBN, under the hypothesis that these would offer the maximum variation possible. Some scenario planning experts were particularly selected because their career and experience were considered as fundamentally important. It is important to note that the researcher did not pre-determine all the participants before commencing data collection. As data collection and data analysis progressed, the preferred characteristics for new participants were determined.

One of the biggest challenges of this research was to gain access to high quality cases and hence high-quality data, and the researcher spent more than one and a half year to achieve this. If this research was to have any considerable novelty, impact, and value, it would require the scenario expert to commit to investing considerable time and effort to the researcher and also have the willingness to be forthcoming. Experience has shown that simply spending 45 minutes with an individual expert in a Skype interview does not achieve the depth that this research sought out to accomplish. For that reason, while participant selection was first and foremost purposive, it also shared some of the characteristics of *snowball sampling*: the researcher asked the initial participants to suggest further cases of scenario planning experts who would be willing to make the commitment required and to make the necessary introductions.

Finally, the researcher concluded investigating new cases of scenario planning experts when *data saturation* was reached, when new data collected offered very little new insight or did not suggest new themes.

3.5 Method of data collection

The primary method that the researcher used to collect data is the *in-depth interview*. This choice was informed by the purpose of this research which is to explore the practice of scenario planning from the perspective of the scenario planning experts and to uncover the participants' meanings and motivations. Interviews was deemed as an appropriate method since they are "*best suited to exploring understandings, perceptions and constructions of things that participants have some kind of personal stake in"* (Braun & Clarke, 2013, p. 81). All interviews conducted were one-to-one, except for one interview, where two scenario planning experts participated. In total, the researcher conducted 39 one-to-one interviews with nine scenario planning experts, with the shortest interview lasting twenty minutes and the longest interview lasting more than three hours. The purpose of this research was to gain a deep understanding of the scenario planning practice, and for that reason, in the majority of cases, the researcher interviewed each one of the participants for a total of more than eight hours, especially with the participants at the beginning of this research. In all cases, the researcher put strong emphasis in contacting the interviews face to face and this was his preferred approach of conducting the interview. However, conducting face to face interviews was not always possible due to geographic restrictions and for that reason, some of the interviews were conducted using Skype. The researcher also considered important to voice record every interview conducted and therefore the significant majority of the interviews were voice recorded. After conducting an interview with a participant and the analysis of the data, the researcher would in some cases ask further questions via email. These emails were also examined by the researcher and constitute part of the data set.

In addition to conducting in-depth interviews with scenario experts, participants provided the researcher with a significant number of documents, such as project reports, scenario planning methodology reports, PowerPoint presentations as well as video

recordings. These documents and video recordings were also examined by the researcher and served as important triangulation and supplementary sources for understanding the scenario planning practice. Details about the documents and other material provided by the participants of this study can be found in Table 6.

Participant #1	17 documents
Participant #3	24 documents
Participant #5	3 documents, 3 video recordings
Participant #8	9 documents

Table 6: Documents and other material provided by the participants of this study.

During the early stages of this research, the interviews that the researcher conducted could be described as *in-depth* and *unstructured* (Robson & McCartan, 2016; Saunders et al., 2012). The researcher had no specific predetermined list of questions, other than the broad open-ended question of '*What do you do when developing scenarios and why?*'. The researcher allowed the interviewee's perceptions of what is important to emerge and the interviewee to guide to some extend the topics of the interview. Based on the participant's responses, the researcher would ask further clarifying questions. As data collection and analysis progressed, the interview questions became more specific and the researcher prepared a specific set of topics to bring in each interview. Finally, it is important to note that the researcher attempted to limit any bias when conducting interviews, by avoiding using questions that led the interviewee to particular answers and by having a neutral stance and tone of voice.

3.6 Method of data analysis

The method that the researcher primarily used to analyse the data was *thematic analysis* as described by Braun and Clarke (2006). According to Braun and Clarke, thematic analysis is an analytic method that involves "*searching across a data set – be that a number of interviews or focus groups, or a range of texts – to find repeated patterns of meaning"* (p.86) and "*is not wedded to any pre-existing theoretical framework"* (p.81) . In his analysis of the data, the researcher also took into consideration the principles of qualitative data analysis by Miles, Huberman and Saldaña (2014), the principles of case study data analysis by Yin (2014) and adopted some of the principles that are commonly associated

with grounded theory (Glaser & Strauss, 1967). The data set that was analysed consists of the transcripts of the voice recorded interviews, documents, emails, as well as notes from those few interviews that were not voice recorded. The researcher placed considerable emphasis on voice recording every interview conducted and fully transcribing each one of the interviews on his own. Transcribing the interviews also enabled the researcher to familiarize himself and gain a deep understanding of the data. The process the researcher followed is presented in detail below.

The analysis of the data followed a multi-layered analytical process that consisted of two levels of analytic codes. Initial coding involved identifying and highlighting segments of data that appeared interesting and important to the researcher in relation to the research question. The researcher then compared the selected pieces of data to other segments of data, seeking to identify segments that are similar in meaning or express a difference along a dimension. Such segments of data were then grouped together, and a name was assigned to the group of data segments. The researcher attempted to stay as close as possible to the original meaning of the participants and whenever it was possible, he used *in vivo* codes to name the groups of data segments. These groups constitute the *first order concepts*. Once a significant number of interviews were conducted and the data were analysed for first order concepts, the researcher started considering how different codes could be combined to form a broader overarching *second order theme.* First order concepts and second order themes, along with the way which indicated how the researcher progressed from first order concepts to second order themes, constitute the *data structure* (Gioia et al., 2013).

Data analysis concurred with data collection. The researcher analysed the data immediately after collection and before seeking to collect new data. The analysis of the data informed the subsequent data collection. It would have been artificial to attempt to separate data collection and data analysis into two major separate phases in this research, as these two activities proceeded together. It is more appropriate to view this research as involving several rounds of data collection and analysis. During the first stages of data analysis, the researcher refrained from developing second order themes and analysis was limited to first order coding. It was only after the researcher had conducted a sufficient number of interviews with four (out of the nine) participants, and

the analysis had progressed, that second order themes and an early data structure was developed. As data collection and analysis progressed hand in hand the researcher constantly compared new data with existing findings, revising and updating first order concepts and second order themes, to fill in the details of existing constructs and add clarity and precision but also developing new concepts and themes. As mentioned earlier, data collection and analysis concluded when the analysis of new data yielded no significant new insights or suggested no concepts or themes. Figure 3 provides an overview of the data analysis process and indicates how interviews contributed to findings.

3.7 Standards for the quality of conclusions

Throughout this study, the researcher took several measures and followed a number of techniques to ensure that this research is of high quality and the findings can be trusted.

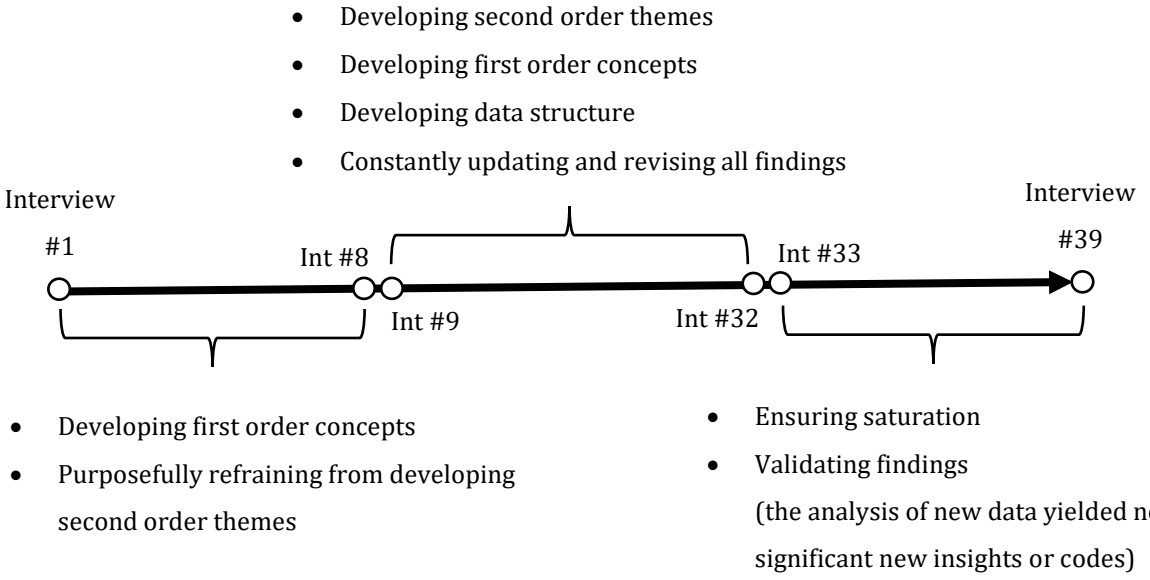

Figure 3: The data analysis process and the contribution of interviews to findings.

Before reporting the techniques that the researcher followed, it is important to present *the standards of quality* in qualitative research. While there appears to be wide consensus among scholars about at least a core set of criteria that can be used to evaluate

quantitative, positivist work (good research is *reliable* and *valid*, including *internal*, *external* and *construct validity*), these criteria apply only to quantitative positivistic research and cannot be applied to interpretive qualitative research due to the inherently different epistemological position (Braun & Clarke, 2013). Several leading scholars of qualitative research have adapted the meaning of the concepts of reliability and validity to fit qualitative interpretive inquiry and other scholars have suggested new concepts that can be used to evaluate interpretive inquiry. In this study, the researcher followed the approach suggested by Lincoln & Guba (1985) that is known as the *trustworthiness criteria*, four criteria that are parallel to ones that are used in quantitative research. The researcher's approach was also informed by Lincoln (1995), and Miles, Huberman, and Saldaña (2014). The criteria and the steps that the research took to fulfil the trustworthiness criteria are described below:

1. The concept of *dependability* in interpretive inquiry is analogous to the concept of *reliability* in quantitative research. Dependability refers to whether the process (e.g. data collection methods, analytical procedures) that the researcher followed is reasonable and in line with the accepted methods and standards of inquiry, is transparently documented and traceable.

2. The concept of *confirmability* has been proposed as a parallel criterion to *objectivity*. Confirmability refers to whether the '*data and interpretations of an inquiry are not merely figments of the inquirer's imagination*' (Schwandt, 2007, p. 300). In addition to that, the research process and the findings should be relatively neutral and free from unacknowledged researcher biases.

3. *Credibility* in interpretive inquiry is analogous to the concept of *internal validity* in positivistic research and refers to the confidence that can be placed in the *truth value* of the findings. Findings should authentically portray the accounts of the participants and there needs to be a high level of fit between the participants accounts and the researcher's interpretations of them. According to Miles, Huberman, and Saldana (2014), other terms that have been suggested are *verisimilitude* and *persuasively written account.*

4. *Transferability* in interpretive inquiry is analogous to *generalizability* and/or *external validity* and expresses the degree to which the results of a study can be transferred (are applicable) to other contexts and/or subjects.

In order to meet the above-mentioned trustworthiness criteria, the research adopted several strategies. Firstly, throughout this study the researcher adopted a *reflexive stance* and constantly examined and questioned his own assumptions, beliefs, values, and preconceptions and how these affected this research. The researcher also kept a reflexive diary where he captured his thought processes. The second strategy was *prolonged engagement*. The researcher spent extended time with the majority of the participants, and this enabled the researcher to better understand their world, to go beyond what is said (and not said), to build trust with the participants, to get rich data and to test for misinformation. The researcher considered this as a core strength of this study and a source of novelty. The third and fourth strategy that the researcher adopted are closely related and involve *peer debriefing* and *auditing*. During this study, the researcher called upon a trusted peer to serve as a sounding board, to vet his ideas, to solicit critical questions to discuss emerging findings and to aid the researcher with all parts of his thinking process. A different but highly experienced qualitative researcher, not associated with the study, was asked to *audit* the empirical process and products of this research, and to interrogate every aspect of it. A fifth strategy involved providing a sufficiently *thick description* of the findings in order to enable the reader to assess whether it is possible to transfer the findings to other settings. Finally, the researcher sought to *triangulate* every claim and assertion that he made. Studying the practices of multiple scenario planning experts and examining documents and other records (in addition to the interviews conducted) served as important triangulation devices.

Chapter 4: Findings

In this chapter, the researcher presents the findings of this study. The research question, as established in the literature review chapter is:

> *What practices do intuitive logics scenario planning experts enact when exploring the future?*

In total, the researcher developed six themes based on the data, namely *understanding the clients, establishing the scenario focus, examining the external environment, developing scenario sets, challenging the assumptions and beliefs of the clients,* and *catalysing conversation and dialogue*. Each of the six themes is presented in further detail below.

4.1 Understanding the clients

4.1.1 Introduction

The first theme that the researcher develops and suggests is *understanding the clients*. This research indicates that scenario planning experts seek to find out and deeply understand several characteristics that are related to the clients of the scenario project, with a particular focus on six characteristics. These six characteristics – as developed by the researcher based on the data – are the issues of concern of the clients, the assumptions and beliefs of the client, the blind spots of the client, axioms and divergences in the client group, how the scenarios will be used and the limits of tolerance of the clients. According to the participants, these characteristics are not immediately known to the scenario planning experts or, the experts feel that the level of understanding is not sufficient. Participants regularly described making significant investment and engaging in several activities that would help them reveal these characteristics and achieve the level of understanding that they consider satisfactory.

The rest of this section is structured as follows. Firstly, in sub-section 4.1.2, the researcher presents those six characteristics of the clients that scenario planning experts

seek to uncover and deeply understand. Following that, sub-section 4.1.3. focuses on the interview and feedback process through which scenario planning experts seek to understand the clients. The rationale why scenario planning experts seek to understand the clients and what they do with this information is the subject of sub-section 4.1.4. Finally, the conclusion of this section can be found in section 4.1.5.

4.1.2 Characteristics of the clients

The issues of concern of the client

Participants of this research regularly expressed that they seek to understand '*what the managers are concerned about*', or '*what matters the most*', or '*the important issues and worries facing them*', or '*what is keeping them awake*' or made an equivalent statement. Similar evidence was also found in many Shell and GBN reports that were examined. The below short abstract from an interview with a scenario planning expert is an example of how some of the above statements were evident in the data.

> '*And it is normally the first thing that you do when an organization wants to engage in a strategic planning exercise, first - of course - you figure out what is the current reality in the organization, what is the strategic agenda, what are the questions that people are asking themselves, what is worrying them, what is keeping them awake. So out of the strategic agenda come all kind of issues, questions, things that people wonder about and they do not know the answer. That is the strategic agenda.*' (Int #7)

What all these terms and expressions have in common is that they refer to matters of considerable importance and interest to the clients of the scenario project. While participants used a variety of terms and expressions to refer to the specific aspect of the client that they seek to understand, most of the participants most frequently used the term *concern*. In addition to that, participants very frequently used the term issue to refer to an individual element of concern of the client. The researcher believes that the terms issue and concerns of the client both express the essence of the pattern he identified in the data, and therefore names the specific aspect of the client *issues of concern*. It is important to note that the issues of concern of the client should not be confused with the issues that constitute the scenario focus.

In this research, participants referred to three different types of issues of concern: decisions and choices, developments in the external environment, and dilemmas. The first two types (decisions and choices, and developments in the external environment) were evident in the accounts of every participant. Dilemmas were only evident in interviews with Shell-related scenario planning experts' reports. According to data, one of the reasons why the clients are concerned about an issue is because there exists a gap in the clients' understanding and knowledge. Each type of issue of concern is examined in detail below:

1. Decisions and/or choices that the clients consider strategic, involve uncertainty and are typically longer run. Some of the examples that interviewees provided include: '*Should we build a gas terminal in China?*', '*How to position [company name] for success beyond its core business?*', '*Which technologies should [company name] pursue most strongly?*', '*Products or services?*'.

2. Developments in the external environment (beyond the control of the clients) that the clients notice, consider important, but '*do not understand and cannot explain*' or "*wonder … as to 'what it is' and 'what its potential implications are for the company*'". For example, in one case that was examined, the managers of a traditional bookstore chain in the mid-late 90s were fundamentally concerned about the rise of internet book sales. In another case examined, the managers of an insurance company were fundamentally concerned about self-driving cars and '*the dramatic way*' that the insurance industry is changing. In the words of the interviewee '*the managers saw self-driving cars threatening their core business*'. As it is also mentioned in this statement, the reason why clients are interested in such developments and they consider them important is because they feel that these developments are going to have a considerable impact on the business model or the organization. According to the data, the focus of multi-stakeholder projects are issues that are un-formulated and lack a clear form and identity (and typically require the co-ordination of multiple actors to address such issues).

3. Dilemmas, i.e. difficult choices between two or more seemingly incompatible alternatives. In the words of one interviewee: '*two conflicting, contradictory*

propositions, both of which are true but seemingly incompatible: e.g. our company is capable of operating anywhere in the world vs our first base and chief preoccupation is with the home market.' (Int #1). Interviewees explained that the origin of dilemmas is lack of knowledge about the issue or the situation.

According to the data, *issues of concern* play a fundamental role in scenario planning. Participants of this research explained that they will not engage in a scenario planning project unless there exists a client who considers one or more such issues as fundamentally important and wants to address them. One of the fundamental objectives of every scenario planning project and the *raison d'être* for its existence is to address the issues of concerns of the clients. Scenarios that address the concerns and needs of the clients were often described as *relevant*. Participants of this research described scenario planning projects that do not address the concerns and needs of the clients as useless, a waste of time, or as failures.

As stated above, clients request the help of scenario planning experts and engage in scenario planning exercises because they feel concerned about one or more issues. Therefore, a very first formulation of the issues of concern already exists when the clients request the help of scenario planning experts. However, all participants of this research expressed a strong preference for conducting interviews with the clients and engaging in other activities with the purpose of achieving a significantly better understanding of what the issues of concern of the client are. Quite often, participants argued that the original formulation of the issues of concern that the clients provided was inadequate or insufficient. For example, participants stated that it is typical of many clients to feel generally worried about a situation, but they are unable to identify what the exact issue of concern is. In other cases, participants argued that they need to understand what is behind the issue of concern that the client originally expressed.

Following the interview and feedback process, the clients and scenario planning experts crystallize and formally establish the issues of concern that the scenario planning project will seek to address. In almost all cases, interviewees used the term *natural agenda* to refer to the set of issues of concern as established after the interview and feedback process. In only one case, one participant preferred the term *strategic agenda*.

Interviewees explained that whenever it is appropriate and possible, they seek to organize the issues of the natural agenda in one *focal issue.* However, as interviewees explained this might not always be possible. Some participants also stated that it is particularly useful to express the issues of concern as *decisions* or *choices* as the clients can better relate to the scenario planning and demonstrates how it is relevant to them. Other interviewees did not express this directly, but by examining previous projects that these interviewees have led, the researcher observed that they expressed the focal issue as a decision. The issues of concern and the natural agenda do not remain static but evolve during the scenario planning process as the situation that the client is facing is better understood.

As a final note, the researcher would like to clarify that the focal issue that the clients are facing should not be confused with the focal issue or the focal question of the scenarios. The focal issue of the clients or the natural agenda is the reason why the clients want to engage in a scenario planning project; the focal question of the scenarios is the question that the scenarios will seek to answer. This distinction becomes more apparent with an example. A client is considering building a refinery in East Asia but cannot make this decision. The focal issue that the client is facing and the reason why the clients might choose to develop scenarios is to determine whether they should build the refinery. In order to make that decision, the scenario planning project will explore how the business environment may evolve. The focal question of the scenarios is 'How may the business environment evolve?'.

How the scenarios will be used

All participants of this research explained that they seek to understand what the most appropriate use of the scenarios for the client might be. Interviewees mentioned a large number of purposes that the scenario project could serve, most commonly: to inform a specific decision or to formulate strategy, to explore how the future external environment might evolve, to identify new business opportunities and renew strategy, to test the robustness of existing strategies, to frame an unstructured issue, to identify common ground among stakeholders, to develop a common language and a shared understanding and to foster group cohesion. According to the interviewees, the clients already have their own thoughts about what they would like to achieve by engaging in the scenario planning

project when they first contact the scenario planning experts. Some interviewees claimed that they do not take the clients' early ideas for granted but, through a series of activities (e.g. interviews and workshops) they try to identify what might be the most appropriate objectives and uses of the scenarios for the specific client of the scenario project. The interviewees further explained that they suggest these to the client and establish the purpose and objectives of the scenario planning project together. The below passage serves as an example of how the above statements were evident in the data.

"*Very often, it is very straightforward to understand whether it is one or the other.* [exploratory or decision-making project]*. But I never like to presume or presuppose that it is one or the other straight away. And connecting into the focal question or framing question, I would very often say to a client 'look, we are not going to devise the specific wording of the framing question right now, we might do the interviews first and then come up with it'. Or there are times where actually I have gone into a first scenario workshop and we are halfway, or we are at the end of the workshop and then we kind of think about and say 'look, from the way this conversation has gone tells us that the scenarios that you really really want to talk about are exploratory ones'. And therefore, you might end up with a framing question in that way. And so, to me, I do think that in most of the time it is straightforward to find out whether it is decision or exploratory, but I am not someone who will insist on having a framing question set up right at the start of the project, I think sometimes it is better for it to emerge. … What I am looking for, from an interview is to what extent are the interviewees energized by the external questions, and to what extent are they energized by the internal questions. And from that you can tell a lot about 'is this going to go better as a decision-oriented process, or an exploratory process?'.*" (Int #9)

The assumptions and beliefs of the clients

All participants of this research stated that they seek to uncover the assumptions and beliefs of the clients, with a focus on what the clients think they know, what they assume about the future and what they treat as certain, either explicitly or implicitly. According to the interviewees, it is most typical in every scenario project that the clients take for granted things that turn out to be either inaccurate or uncertain. In addition to that, clients also have a very narrow view of the future. Revealing the assumptions and beliefs

of the clients was considered as fundamentally important for the success of the project by all interviewees. The reason that participants provided is that they cannot challenge the assumptions and beliefs of the clients unless they know what these are in the first place.

The blind spots of the clients

Many participants stated that they seek to identify *blind spots*, i.e. issues that are significantly important according to the scenario planning expert, but the clients seem to be ignoring. According to the interviewees, an objective of a scenario planning project is to bring such issues to the attention of the clients. However, it is up to the client to decide whether to acknowledge, accept and include these issues in the scenario planning project or to ignore them. Participants explained that they rely on their own knowledge and experience in order to identify blind spots. Revealing blind spots was described by the participants as something they seek to achieve in every scenario planning project, and some participants consider it as fundamentally important for the success of the project. The practice is mainly achieved through the interview process, or through other activities.

Axioms and divergences

Many participants mentioned that they seek to identify axioms and divergences among members of the client group. Axioms can be described as '*notions which everyone seems to accept, without questioning the underlying logic, which therefore need challenging*' (Shell, 1995). Divergences can be described as '*cases where people either disagree outright in what they say or where the perception of what is vitally important is not supported by others*' (Shell, 1995). Identifying axioms and divergences was described by these participants as a routine practice in every scenario planning project.

The limits of tolerance

Challenging the assumptions and beliefs of the clients (a core objective of a scenario planning project) involves presenting to the clients novel but credible information that contradicts their existing assumptions and beliefs. The intention is that the clients will not reject this information, but they will accept it and eventually internalize it. Depending on the novelty of the information and other factors, it is possible that the clients might

reject the information. Interviewees explained that they seek to identify the limits of tolerance of the clients, beyond which the client will reject the novel information.

4.1.3. The interview and feedback process

According to the interviewees, the '*best*', '*standard*' or '*preferred*' way to gain this understanding of the clients is through the interview and feedback process. All participants provided examples of real-life projects where the first phase of the project consisted of interviews with the clients. Similar evidence was found in Shell and GBN reports, and especially in the *Manager's Guide to Practical Planning in Shell* report (1995), where a version of the interview and feedback process is described in detail. Based on the data, the interview and feedback process can be described as a structured, and to a large extent, formalized process. Participants of this research placed strong emphasis on five elements:

- Deciding who to interview
- Conducting the interviews using the Seven Questions
- Analysing the interviews across specific dimensions
- Clustering the clients' statements to identify themes in the data
- Presenting and discussing the findings with the clients, typically in a workshop setting.

While the interview and feedback process was considered the 'standard' or the 'preferred' way to gain a deep understanding of the clients, participants of this research also gave examples of scenario planning projects where they did not conduct interviews with the clients, typically due to resource constraints. The interview process was described as a resource-intensive process that requires considerable amounts of time and effort. Whenever these resources were not available, participants of this research sought to understand the clients through less structured discussions with the clients and/or workshops. However, this was mostly considered a shortcut that would lead to lower quality results, as compared to the interview and feedback process. It is important to note that interviewing the clients should not be confused with interviewing experts, as the purpose of the interviews is different. According to the anecdotal evidence, the

interview and feedback process started becoming a formal and structured process within Shell only in the late 80s. Before that, but also during the 80s, scenario planning experts held extensive conversations with the clients.

Timing

Participants of this research strongly insisted that their first step in every scenario planning project is to understand the clients. They also provided examples from real life scenario planning projects that they have led in the past and in all cases, the first phase of the project consisted of activities (e.g. interviews with the clients, workshops) aimed at understanding the clients. Participants of this research considered gaining this understanding early in the scenario planning project as fundamentally important for the success of the project. Many interviewees argued that no scenario planning should begin without firstly gaining a sufficiently deep understanding of the client, while others claimed that if this understanding is missing, then the project will be of lower quality or may lead to it being considered as unsuccessful. To demonstrate how some of the above statements were evident in the data, two short abstracts are presented below.

"*Therefore, before starting any scenario research, scenario writers first spoke with the managers to discover what were the important issues and worries facing them. These discussions created a 'natural agenda' for the scenario work so that when the stories were presented the managers recognized the issues that were being addressed … First, I believe firmly that no scenario work should begin without first 'setting the natural agenda' in discussions or interviews with management*". (Int #1, manuscript)

'*And it is normally the first thing that you do when an organization wants to engage in a strategic planning exercise, first of course you figure out what is the current reality in the organization, what is the strategic agenda, what are the questions that people are asking themselves, what is worrying them, what is keeping them awake*.' (Int #7).

The researcher sought to better understand what interviewees mean with the term 'first step', i.e. when exactly in the scenario planning project the activities related with understanding the clients take place. In all cases, interviewees explained that they seek to understand the clients before establishing the scenario focus and determining the

questions that the scenario project will attempt to answer. In some cases, interviewees divided the process of developing scenario into three phases. The first phase was often called the orientation or framing phase and involves activities related to understanding the client and establishing the scenario focus. The second phase involves research related activities and was often called the exploration phase, while the third phase consists of developing scenarios. Finally, it is important to note that participants described checking with the clients throughout the scenario project in order to determine that they sufficiently understand the clients, especially as the project evolves.

4.1.4 Rationale behind the practice

The researcher set out to find out why scenario planning experts seek to understand the clients and what they do with this understanding. As discussed earlier, the reason why a scenario planning project exists is because the clients are facing one or more issues of concern and need to address these. Interviewees explained that they need to have a particularly good understanding of the issues of concern if they are to successfully address these. In addition to that, it was often argued that a superficial understanding of the issues will lead to sub-optimal results. Similarly, all participants of this research portrayed the assumptions and beliefs of the clients, the axioms, and the blind spots of the clients as elements of a *problem situation* that the client is facing and needs to be dealt with. Scenario planning experts need to know the assumptions and beliefs of the clients, the axioms, and the limits of tolerance of the clients in order to challenge their assumptions.

Based on the above, understanding the clients can also be described as *diagnosing the problem situation that the clients are facing*. Thus, a scenario planning project also involves a diagnostic phase where the scenario planning experts seek to diagnose the problem situation, or, to arrive at a more advanced understanding of the problem situation that the clients are facing. All participants of this research explained that the first step in a scenario planning project and before attempting to address the problem is to diagnose the problem and arrive at a sufficiently good understanding of it.

4.1.5 Conclusions

In conclusion, this research indicates that scenario planning experts seek to understand the clients of the scenario planning project. Based on the data, the researcher puts forward six characteristics of the clients that the scenario planning experts seek to understand, namely: the issues of concern, the appropriate use of the scenarios, the assumptions and beliefs of the clients, the blind spots, axioms and divergences and the limits of tolerance of the clients. In a typical scenario planning project, understanding the clients is achieved through the interview and feedback process that takes place in the early stages and before establishing the focus of the scenario planning project. Understanding the clients can also be described as diagnosing the problem situation that the clients are facing; the objective of the project is to address this problem situation. Therefore, a scenario planning project also involves diagnosing the problem situation before seeking to address the problem. Table 7 provides an overview of the theme and shows which cases support the findings presented in this section. Table 8 and Figure 4 serve as additional evidence that demonstrate the prevalence of the theme in the data.

Theme and sub-themes	Supporting cases
Understanding the clients	All participants
o Identifying issues of concern	All participants
o Identifying the appropriate use of scenarios	All participants
o Identifying assumptions and beliefs	All participants
o Identifying blind spots	Par. #1, #3, #4, #6, #8
o Identifying axioms and divergences	Par. #1, #3, #4, #5 #6, #8
o Identifying limits of tolerance	Par. #1, #2, #4

Table 7: The theme understanding the clients, along with the cases that support the findings.

Int #1	*The interviews with clients are designed to understand their perspectives on issues. What are the key concerns they have, what are the decisions they are facing? You also use the interviews to identify what people know about the situation and what they assume about the future. At least, this is what I am looking for. Out of these interviews you create a natural agenda of issues the scenarios should address.*

Int #2	*And part of the reason we interview people in and outside the firm is to find out what the tacit mental models are. Because that's what we are trying to ask about. And often, they haven't written it down, they haven't formalized it yet. It is just the built up of experience in their mind. When that happens, it tends to cause that and when this happens it does something else. So, if we did a full knowledge, something you call a knowledge representation, knowledge reverse engineering kind of exercise, we would try to get these people to sit down and find out what all the causal relationships are that they hold in their mind.*
Int #3	*Frequently, the natural agenda is open ended questions – I take everything you've got, I break it down to individual statements and I build a tree structure back up. Which contains the views of all the interviewees. And that interview structure. I then look for commonalities of view, differences of views and issues. So, what I do is give feedback without pointing to any individual. This is your collective view of the issues you are facing; this is the language you are using, this is where you have common views, this is where you seem to have fundamentally different view.*
Int #4	*What we did, was we did interviews of the main decision makers in* [company]*. For instance, the general manager of* [company] *was* [name]*. We interviewed him using the Seven Questions of Shell. And then, we organized the material to find what are the themes, what was the management team thinking together.*
Int #5	*The interviews were 'open', zooming in on what interviewees themselves thought was urgent and important. This applied to the oil world in general, but also to the implications for the industry (as a whole, rather than Shell in particular). We had to ensure that the people who had to use the scenarios in Shell, clearly they recognized their own topics and concerns, their personal worldviews and belief – in at least one of the scenarios.*
Int #8	*So usually, I do not come up with the focal question from the interviews, but what the interviews do is to provide a deeper understanding of what the issue is and maybe a narrowing of what the uncertainties are, and that sort of things…. interviews give you a chance to understand the mental models, the blind, the different forces on the external, the trends and what they see ahead.*

Table 8: Additional evidence demonstrating the prevalence of the theme *understanding the clients* in the data.

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Figure 4: The interview process – figure as found in a GBN report (2009, sl. 38).

4.2 Establishing the scenario focus

4.2.1 Introduction

The second theme that the researcher develops and suggests based on the data is *establishing the scenario focus*. This research indicates that scenario planning experts, along with the clients of the scenario project, carefully select a manageable set of areas in the external environment that will be the centre of interest and activity in the scenario planning project. It was frequently argued that it is impossible to examine the entire future environment and that, without a clear focus, the scenario team would most certainly be overwhelmed. By establishing the scenario focus, a conscious choice is made about those areas of the external environment that will receive little attention or no attention at all. The practice was evident in the accounts of each participant of this study and in both Shell and GBN reports. Further to that, interviewees considered establishing the scenario focus and its quality as critical factors for the success of the project. Finally, it is important to note that interviewees used a large number of terms and phrases such as *scoping*, *framing*, *focusing the scenarios*, *bounding the scenarios*, *orientation*, *scenario boundaries*, *focal question*, *scenario focus*, *focal areas* to express the practice of establishing the scenario focus or refer to elements that capture the scenario focus.

This section is structured as follows. In section 4.2.2 the researcher elaborates on the concept of the external environment and which of its areas are appropriate for inclusion in the scenario focus. This research identified two constructs that scenario planning experts most often use to capture and express the scenario focus, namely the focal question(s) of the scenarios and the research agenda. These two constructs are examined in section 4.2.3. The findings in relation to how scenario planning experts and the scenario team decide the scenario focus and the factors that influence its quality are presented in section 4.2.4. Section 4.2.5 explores when the practice of establishing the scenario focus takes place and how it evolves throughout a scenario planning project. Finally, conclusions and a summary of this section can be found in section 4.2.6.

4.2.2 The external environment

In all cases, participants of this research strongly insisted that a scenario planning project should only focus on and examine that part of the environment that is external to the clients and beyond their direct control and influence. In addition to that, it is critical that the scenarios do not include decisions, choices, strategies, or in general actions of the clients. Almost all participants argued that including the actions of a client or examining a part of the environment that is within the direct control and influence of the clients is a methodological fault that would most certainly lead to project failure (at least by the participants' standards). The reason according to some of the interviewees is that in order to effectively design strategy, one needs to consider and examine the external environment, actions, as well as the fit between these two, independently of each other.

As an interesting note, the researcher observed that many participants of this study referred to the very same conceptualization of the external environment that has its roots in the work of Emery and Trist (1965). This conceptualization was also found in some GBN reports. According to this conceptualization, and as described by the participants of this study, the environment that is external in relation to a specific actor (in this case, the client group), consists of two parts, the transactional part and the contextual part. The contextual environment is defined as this part of the environment on which the scenario client has insignificant or no influence at all. The contextual environment includes factors such as demographics, social change, environmental change, political developments, technology, and international finance among others. On the other hand, the transactional environment is defined as this part of the environment that the actor has some influence but cannot directly control. Commonly mentioned elements of the transactional environment are actors such as competitors, suppliers, customers, stakeholders, or, as one interviewee vividly described '*anyone you can shake hands with*'. In case different actors collaborate, the capacity to influence the external environment may increase significantly. Figure 2 is a graphical representation of this conceptualization of the external environment, as found in a GBN internal presentation (2008).

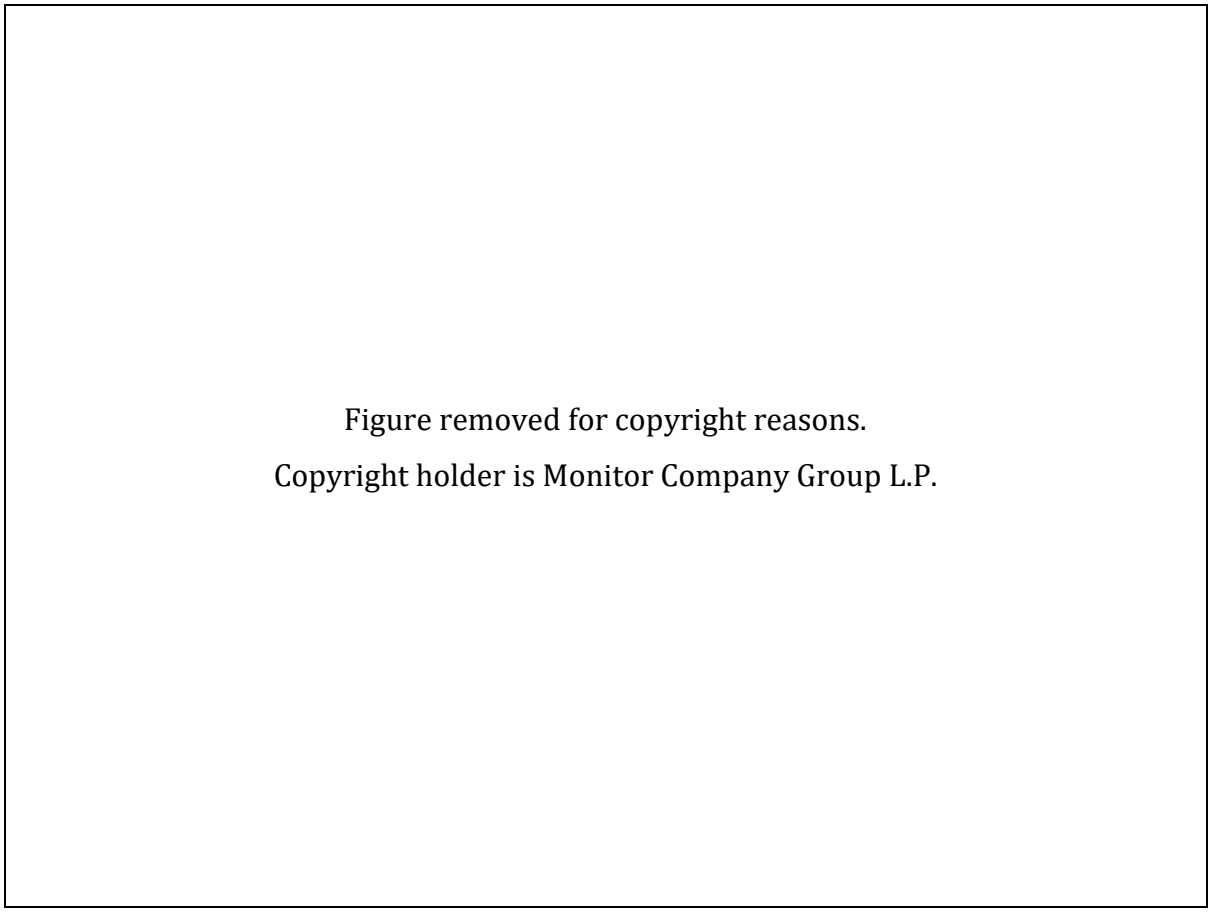

Figure 5: The external environment in relation to an actor. From GBN (2008).

4.2.3 Constructs that express the scenario focus

This research indicates that scenario planning experts, along with the scenario team and the clients of the scenario project express the focus of the scenario project mainly by developing two constructs: the focal question(s) of the scenarios and the research agenda. These two are examined separately and in detail below.

The focal question of the scenarios

The focal question of the scenarios is defined as the main question that the scenarios and the scenario project will attempt to answer. It is expected that the team that develops the scenarios will focus only on those things that contribute to answering the specific question and refrain from examining topics and conducting work that does not contribute to answering the focal question of the scenarios. It is important to note that the focal question of the scenarios does not specify a hard boundary, but indicates what is directly relevant, distantly relevant, or not relevant at all. It is quite common that the scenario planning experts along with the clients and the scenario development team formulate

more than one focal question, typically two or three. The focal question of the scenarios is essentially similar to what was sometime referred to as the *focal issue of the scenarios*; the focal question expresses the focal issue in the form of a question. To indicate how some of the above findings were evident in the data the below abstract from an interview is included.

"*That is why we always say that the definition of the focal question defines the methodology. The focal question must describe what the scenarios must shed light upon. You have to do that in the beginning, otherwise, your scenarios are going to be all over the place. So, you have to say, from the beginning what the scenarios are going to be about. By implication you are saying what the scenarios are not about. Which I illustrated with the* [name] *scenarios. They are not about certain things. If somebody says, 'What about* [region name]*?', the facilitator will say 'This* [region] *is not in our scenarios. The focusing question doesn't talk about that'. Remember, it is a loose process."* (Int #4).

It is fundamentally important to distinguish between the focal question of the scenarios (and the focus of the scenario project in general) and the natural/strategic agenda of the clients, that may also be organized and expressed in the form of a set of focal issues or questions. This distinction was also strongly emphasized by some of the participants of this research and can be best understood by an example. In one real life scenario planning project that the researcher examined, the focal questions of the strategic agenda that were established are: '*How to position* [our company] *for success beyond its core business? What are the opportunities we should explore?'.* These two focal questions referred to the actual concerns of the clients and were expressed as *choices*. To answer and address the two focal questions of the strategic agenda, the scenario planning expert and the scenario team agreed to explore how people's lives in the specific country may change in the future. The focal question of the scenarios that was established is '*What is the future of* [country] *lives through 2025?*'.

The research agenda

As the name suggests, the research agenda consists of a set of issues and questions that are selected for future research. One interviewee defined the research agenda as '*what do we need to know in order to understand the issues being raised?*'. The research agenda

is established in a way that reflects the objectives of conducting research and analysis, in scenario planning, namely searching for theories of how the relevant part of the world works, identifying critical issues and critical uncertainties and searching for novelty but also credibility.

4.2.4 Selecting the focus of the scenario project

Many participants of this research argued that deciding the focus of the scenario project is one of the critical decisions in a scenario planning project and plenty of care must be taken so that the scenario focus is the appropriate one. The reason is that the scenario focus establishes the direction for the project, and it can therefore strongly influence its success and failure. The short abstract below from an interview demonstrates this point.

> *'If you don't frame it properly, the rest is wasting people's time. So, if you don't think clearly about what are the right questions to ask, you are answering the wrong questions. And when you are answering the right questions, can you have the right scenarios?'* (Int #3)

The researcher sought to better understand how the scenario planning experts determine the scenario focus and what is considered as an appropriate or high-quality scenario focus. Firstly, and most importantly, all participants of this research strongly argued that the scenario focus should be relevant to and address the concerns and needs of the clients. The scenario focus anchors and leads the scenario planning project and therefore, it should be selected in a way that directs the project to addressing the concerns and the needs of the clients. This was often referred to as the *relevance criterion.* According to the interviewees, having a deep understanding of the needs and the concerns of the clients is paramount for informing the selection of the scenario focus. Further to that, some scenario planning experts argued that without understanding the needs and concerns of the clients it is impossible to focus the scenarios, or, in other words to develop scenarios that address the concerns and the needs of the client As it is also expected, a superficial understanding of the needs of the clients would most probably lead to scenario focus of lower quality. Finally, some interviewees made the argument that without a client it is impossible to establish a scenario focus that a later audience will find relevant and useful. In their experience, such scenarios are never used, and the

clients do not find such scenarios more useful than an entertaining story about the future. It is important to note that while the issues of concern and the needs of the clients strongly influence the selection of the scenario focus, the choice is not straightforward, and there is a significant level of freedom for the selection of scenario focus. Scenario planning experts explained that finding the scenario focus that would offer the most of value to the clients is part of the art of scenario planning. The below abstract from an interview with a scenario planning expert is a representative example of how some of the above claims were evident in the data.

> '*This is about relevance. This is about relevance. The scenarios have to connect. That is meaning. And if you want to make the scenarios as relevant as possible, you want to know what is the strategic agenda, what is the intended use and purpose of the scenarios and you want to derive as good as possible focal question or focal issue for the scenarios. So, when you develop them, you can shed maximum light on the questions that need informing.*' (Int #4)

Secondly, the scenario focus must reflect the *perceived critical uncertainties* in relation to the situation being examined. According to the interviewees, this is a fundamental principle of scenario planning. The rationale for this can be found in the below small abstract from a Shell internal report.

> '*Uncertainty is important, because if future market conditions appear relatively assured, or if the elements of uncertainty are irrelevant to the business at hand, then there is no call for a systematic consideration of alternative future business environments.*' (Shell, 1986a, p. 3)

Thirdly, interviewees explained that the purpose of establishing the scenario focus is to prevent the scenario team from wandering away from the topics that are relevant for the clients and the scope of the scenario project. However, the scenario focus significantly limits the opportunity for exploration of issues beyond the scenario focus that may be relevant and important for the client and the project. Depending on the needs of the clients, the purpose of the project and the level of understanding of the relevant situation, scenario planning experts argued that it is important to achieve the right

balance between a narrow or broad scenarios focus. Especially when the situation is not well understood, scenario planning experts recommended against a narrow scenario focus that would lock the scenario team in a specific direction. Achieving the right balance was again considered part of the art of developing scenarios.

Finally, the level of understanding of the situation that the client is facing was also considered a factor that contributes to the quality of the scenario focus. Quite often, the scenario planning experts would conduct research, use their own knowledge of the subject area or ask the scenario team to engage in a number of activities that would increase this understanding.

4.2.5 Positioning the practice in the scenario development process

According to the data, the first substantial formulation of the scenario focus occurs at the beginning of the scenario planning project, soon after the interview and feedback process and once the scenario planning experts have gained a sufficiently good understanding of the clients, their concerns and needs, and the overall situation. Most typically, the clients and the scenario planning experts have some early thoughts and ideas about the focus of the scenario project during their early contacts and before commencing the scenario planning project. However, many participants of this research argued that they strongly prefer to systematically interview the clients and conduct some preliminary research before establishing the scenario focus. According to the participants, the choice of the scenario focus is one of the important decisions in a scenario planning project because it sets the whole direction for the project. A better understanding of the clients and their situation would lead to a better choice for the scenario focus.

Most typically, the scenario focus is formally established at the end of the *orientation* or *framing workshop.* During this workshop, the results of the interview and feedback process are presented and discussed, along with the results of any preliminary research conducted. The participants of the workshop may also engage in several activities, such as the development of prototype scenarios. Establishing the scenario focus also typically involves many offline conversations with the clients. In most cases, the scenario planning experts present to the clients two or three options about the scenario focus and discuss what is the most appropriate and meaningful for the clients

and their needs. The first phase of a scenario planning project that involves the interview and feedback process and establishing the scenario focus was often called *the orientation phase*. Other phases in a scenario planning project include the *exploration* or *research* phase, the *scenario development* phase, and the *scenario affirmation* phase.

Establishing the scenario focus in the beginning of a scenario planning project does not mean that the scenario focus remains the same throughout the project. This research indicates that the focus progressively evolves during the scenario project, as knowledge and understanding accumulates. The below short statement serves as an representative example of how this finding was evident in the data. In this example, the scenario planning expert refers to the focal question of the scenarios as the organizing question.

'*And the other thing about the changing organizing question, is that scenarios are also - when used well - are also a tool for learning about the world you are working in. So, we changed our question at the end of the second workshop. Because the client has come to a different understanding of what was going on in the country. It was not just about* [name of politician]. *It was about how we will be governed more generally. … And remember, the question does tend to evolve as people get more familiar with the subject and have a better understanding of what it is they really mean to ask. So sometimes you get it right the first time and it pretty much holds steady for the whole process. Other times it needs a bit of shaking as you go along*.' (Int #1)

The researcher examined several real-life scenario projects in relation to the focus and the focal question of the scenarios. In roughly half of the cases examined, the scenario team formulated a relatively broad and generic focal question following the interview and feedback process e.g. '*What will shape the future of our industry in our country over the next 20 years?*'. While this question is broad enough, it still focuses the activities of the scenario team by indicating that the subject of attention is the specific industry in the specific country and not anything else. In addition to establishing the focal question of the scenarios, in each case the scenario team also developed a research agenda, that further captured the focus of the scenario project and served as an anchoring point for the next phase of the project. In one such case of scenario project, the research agenda

was organized around four issue areas, namely, energy, resilience, jobs, policy. Following a period of research and analysis, in each case the scenario team identified and selected several issues or areas in the external environment that effectively constituted the focus of the scenario project (e.g. ecosystems, attitudes, social stress and politics, institutions, and governance). Finally, a more specific and final set of focal questions was formulated towards the end of the project, and in a few cases, even after the scenarios were developed. In the data, this is was a typical case of an exploratory scenario planning project.

In some other cases that were examined, the scenario team developed a set of focal questions in the beginning of the project that substantially changed and evolved during the scenario project. According to the interviewees, this change in the scenario focus reflects a better understanding of the situation and the questions the clients meant to ask. Finally, in a few cases, the scenario team was able to develop a set of focal questions in the beginning of the project that remained the same until the end of the scenario project. Again, the scenario team also relied on a research agenda and selected a number of areas in the external environment to focus on.

4.2.6 Conclusions

An important finding of this research is that scenario planning experts, along with the scenario development team, do not seek to examine the whole external environment but carefully select and specify a set of areas in the external environment that will be the centre of interest and activity in the scenario planning project. This set of areas constitutes the *scenario focus*. The scenario focus is most clearly captured and expressed through the constructs of the *focal questions of the scenarios* and the *research agenda* that are established in a scenario planning project. According to the data, only areas in the external environment and beyond the direct control and influence of the clients are appropriate for inclusion in the scenario focus. The researcher identified four factors in the data that influence the quality of the scenario focus and the success or failure of the scenario planning project. Most importantly, the scenario focus should be carefully selected in a way that reflects the issues of concern and the needs of the client, the purpose of the scenario planning project, and the perceived critical uncertainties. In addition to that, the level of understanding of the situation the clients are facing and

achieving the appropriate balance between a broad and a specific scenario focus are factors that influence the quality of the scenario focus. The first formal formulation of the scenario focus occurs after the interview and feedback process and the scenario focus evolves throughout the project. Table 9 provides an overview of the theme and shows which cases support the findings presented in this section. Table 10 serves as additional evidence that demonstrate the prevalence of the theme in the data.

Theme and subthemes	Supporting cases
Establishing the scenario focus	All participants
o Developing the focal question(s) of the scenarios	All participants
o Developing the research agenda	All participants

Table 9: The theme establishing the scenario focus, along with the cases that support the findings.

Int #1	*As for distinguishing between the 'natural agenda' and the research agenda, the two evolve together. I tend to think of the natural agenda being the kinds of business choices a management team is facing, or the signals of something new in the world that people don't understand. One of the questions I use when I interview people is 'what have you noticed, but cannot explain?' … In analysing the interviews, the key themes and concerns start to emerge, as well as all those issues that are unmentioned but potentially important. Once the issues are identified, the research agenda starts to ask: what do we need to know in order to understand the issues being raised here?*
Int #2	*And it is the first thing you want to do, because in a scenario project you cannot cover everything, you need to have focus. And this is what the focal question is all about, it guides the work.*
Int #3	*The focal questions highlight the most critical uncertainties or the most important un-knowable elements in the problem. Problematique. One example,* […] *The focal questions pose questions. The scenarios give you answers under different fundamental assumptions. So, you answer the focal questions, no we can't improve productivity, whether you are government or market led, you've got this problem. Yes, we can improve productivity. This is through innovation, markets, this is through much more state led design programs of infrastructure*

	support, education. Three scenarios, focal question poses the question and the critical unknowable elements. Scenarios provide the answer.
Int #5	*You develop the* [focal questions] *at the beginning. Not as a very first step, but once you have talked to a lot of people, or perhaps you are halfway through the interviews. And when you get a feeling about what the people are worried about.*
Int #7	*First of all, from that strategic agenda, you can derive what should be the focus of the scenarios. The strategic agenda belongs to the organization. And it decided to do scenarios to shed light on that. To generate context that gives meaning to those questions. So, from that, from the strategic agenda, you can actually determine what is the correct focus for the scenarios, what the scenarios should be about, in order to be relevant for the strategic agenda. So that is called the focal question or the focal issue of the scenarios.*
Int #8	*I always think of the focal issue as what the scenarios are about. You know, what is the future of the consumer automotive demand. Typically, the focal issues, they may be very broad, you know, what is the future of our industry, what is the future of publishing. There are different levels of granularity. The more precise you can be of course, the narrower the focus, the closer you can link to specific decisions, you have more insight, you have a narrower window. But sometimes you do now know enough to be able to narrow things down.* […] *Because if you do not know enough and you narrow down too much with your focal issue, you might not be looking at the right things, or you might be missing something that turns out bigger.* […] *So, it is a bit of a trade-off between seeing all the forces that are out there, understanding the world, vs actually influencing decision making.*
Int #9	*And connecting into the focal question or framing question, I would very often say to a client 'look, we are not going to devise the specific wording of the framing question right now, we might do the interviews first and then come up with it'.*

Table 10: Additional evidence demonstrating the prevalence of the theme *establishing the scenario focus* in the data.

4.3. Examining the external environment

4.3.1 Introduction

The third theme that the researcher develops, defines, and suggests based on the data is *examining the external environment*. This research indicates that scenario planning experts, along with the scenario development team, conduct research, gather information, facts and evidence, formulate research questions and analyse the external environment, having purposes specific to scenario planning in mind. One of the most important outcomes of examining the external environment is the development of a foundation for constructing scenarios. Based on these findings, scenario planning can be described as an analytical and intellectual process, an argument that was also frequently made by all the participants of this study.

The rest of this section is structured as follows. In section 4.3.2, the researcher presents the findings in relation to conducting research and analysis in scenario planning and the importance the participants of this study ascribed to it. In section 4.3.3 the researcher delineates and elaborates on what constitutes examining the external environment. The subject of section 4.3.4 is individuals that are important sources of information and knowledge in a scenario planning project. Finally, conclusions can be found in section 4.3.5.

4.3.2 Research and analysis in a scenario planning project

According to the data, a scenario planning project involves conducting research, gathering data and analysing the external environment. All participants of this research argued and strongly emphasized that research and analysis play a fundamentally important role in scenario planning. Many participants insisted that scenario projects that do not involve research and analysis (or where this aspect is considerably downplayed) are of considerably lower quality or were even described as failures. The importance of research and analysis can also be seen in the amount of resources (e.g. time, money, effort) that are invested in the related activities: research and analysis can easily become the most expensive and time-consuming element of a scenario planning project. To demonstrate how some of these findings were evident in the data, two abstracts from interviews are included below.

'*These are enduring features of scenario work appearing, but even then, scenarios have been applied to so many different problem-sets, so many different areas. For me the one commonality across different industries, countries work, is that you try to do rigorous analysis. Robust, well thought, thorough analysis. If it fails at the analytical level, it probably fails on all levels. They will not take you seriously. There is nothing worse to scenario people than not to be taken seriously. Most of the time they are not taken seriously, or half of the time. I am serious, for me that attention to rigorous analysis, that's more important than anything else*'. (Int #3)

'*Because you are talking about the future, I must have said this before, the future does not have any data. The past has data. But the future has no data. So, what we are doing is using our imagination, we are using some extrapolation from our logical… but we must be able to argue why that could happen. It's not a brainstorm, it's more an analytical process. And that is very deep research. This is not trivial. So, you do deep research and then you can conclude.*' (Int #4)

Typical research activities in a scenario planning project involve conducting surveys, interviewing experts, conducting case studies, gathering statistics, developing chronologies, mapping the business ecosystem or other relevant system, conducting competitive analysis, or simply searching for and gathering data and facts. In a most typical scenario planning project, the majority of the research and analysis is conducted after establishing the scenario focus and before developing the scenarios. This phase of a scenario planning project was sometimes called the *exploration phase*. However, it is also very common that some research and analysis is also conducted during the orientation phase of the project and after the scenarios are developed.

According to the participants, research and analysis is such an important aspect of scenario planning for several reasons. Firstly, research and analysis were directly linked to what was stated as one of fundamental purposes of scenario planning: to advance the understanding of how the relevant part of the world works. Secondly, research and analysis are the main means through which novel ideas and understanding

are found and introduced in the process. Finally, research and analysis can provide the credibility to trust the claims made about the present and the future.

4.3.3 What constitutes examining the external environment?

The researcher sought to further examine and better understand what scenario planning experts do when they conduct research and analysis in a scenario planning project. In some cases, the participants argued that research and analysis in scenario planning is different from what was considered typical research. The researcher identified in the data six core characteristics of research and analysis in scenario planning, and based on that, defines the theme of examining the external environment. These six characteristics are: describing and explaining how the relevant part of the world works, identifying driving forces, predetermined elements and critical uncertainties, introducing novelty and having credibility. Theories of how the world works, driving forces, predetermined elements and critical uncertainties constitute the building blocks, the foundation based on which the scenarios are developed. Each of the core aspects is examined in detail below.

i) Describing and explaining how the relevant part of the world works

A most important finding of this research is that scenario planning experts, along with the scenario development team seek to *describe, explain and understand how the relevant part of the world works*. A most typical example of this is the search for (system) structure. Specifically, almost all participants of this research referred to the ideas and concepts of system structure, system behaviour and the perception iceberg, and described searching for the structure of the system that would allow them to explain past and future behaviour and outcomes. According to this conceptualization, as narrated by the participants of this study, events in the past and present along with trends and patterns are produced by a deeper, underlying systemic structure that has enduring features. The objective is to infer the implied structure by examining the events and identifying the patterns. The system structure that explains how the past events and patterns are produced can be used to infer and explain future behaviour and outcomes. The short abstract from an interview below is an example of how the above claims were evident in the data. Figure 3 was found in one GBN internal report and shows the idea of the

perception iceberg as it was applied in the case of High-profile wildfires in Western USA (2009, p. 101).

"*So, the brief I give them between scenario workshops is 'Take the systems iceberg, I want you to look at this driving force and give me the events level information. Then identify what patterns of behaviour do you see over time, related to this key driving force'. … The brief is take the driving force, use the iceberg, jot down to the structure, come back to the next workshop and tells us how it works, how the structure is, how do you understand it, and then tell us the two or three or four different ways, that this can play over the scenario period. And why. So, I force them to firstly understand how it works and then give us pieces of the scenarios. So, if the scenario period is over the next ten years, then I want you to tell me how this plays out over the next ten years.".* (Int #4)

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Figure 6: The perception iceberg, as applied in the case of *High-profile wildfires in Western USA*. As found in an internal report from GBN (2009, p. 101).

It is most important to note that descriptions and explanations of how the relevant part of the world works may not necessarily take the form of the perception iceberg and system structure and may not be systemic at all. For example, a theory of how the world

works that was frequently found in oil and energy related scenario projects in Shell is the pork cycle economic model that describes and predicts cyclical fluctuations in the supply, demand and prices of commodities. This theory was used in the Long-Term Scenarios – Oil scenario project from Shell to predict and explain fluctuations and the increased volatility in the price of the oil (Shell, 1986b). A description of how the world works can also be in the form of a (non-system) model, or it can be as simple as a statement. For example, in one case of scenario planning project, the clients of the project were arguing that selecting nuclear energy as the primary source of energy supply in the region and investing on it will lead to the creation of a larger number of jobs, compared to other forms of energy. What is interesting, however, is that on many occasions, participants of this study argued that much research and analytical work in scenario planning may not be labelled using system terms (system structure, perception iceberg), but it is essentially the search for system structure. For example, one participant was arguing that a statistical analysis of the population of a country (e.g. agricultural population, rural population, university educated, living in large towns) essentially represents the deep underlying structure.

Almost all participants of this research argued that achieving a deep understanding of how the relevant part of the world works is one of the most fundamental objectives of scenario planning and a most significant part of its usefulness. According to the data, this understanding is used to i) make inferences and draw conclusions about the future and ii) explain why a specific future may come about. As briefly mentioned above, an argument that was frequently made by many participants of this research was that '*the future has no data*'. In order to examine the future, one needs first to examine the past and the present and understand how the relevant part of the world works.

ii) Driving forces

This research indicates that scenario planning experts, along with the clients and the scenario development team, seek to identify and further examine *driving forces* in the external environment, and beyond the control of the clients. According to the data, driving forces have two defining characteristics. Firstly, driving forces are thought to be shaping the future, in relation to an area of concern and interest of the clients. Secondly

driving forces are thought to have an important impact on the business, organization, or in general a subject of interest to the clients of the project and always in relation to the focus and purpose of the scenario project. According to the data, a scenario planning project focuses on specific set of driving forces because these driving forces are thought that they will strongly influence the business or subject of interest of the clients. It is most important to note that participants of this research also used the terms *drivers*, *issues, factors, variables* and *dynamics* to essentially refer to driving forces. To demonstrate how the above finding was evident in the data, two small abstracts are presented below.

'*So, implicitly, when the bookstore is kind of interested in those topics, implicitly it is because it feels a threat to its business model of course. That its business model might become obsolete. By definition. So, the scenarios should be about anything that affects their business model. That is implicit. And even if I do not say it, that is actually what is going to be. Therefore, other driving forces are the price of the real estate, by definition. If I know, if they are interested in e-commerce and the rise of the internet, well those are two driving forces that are on their radar, of which they can already intuitively see that it will affect their business model. But if I am going to make scenarios, for sure, those two elements are going to be part of that, but I would include all the driving forces in the end that matter for the implicit business model. And if their implicit business model is based on physical stores, well prices of real estate are going to be an important factor in that.*' (Int #7).

'*Driving forces is a key term, but in order to understand the nature of the forces shaping the future, research is needed to dig deeper into what drives the driving forces. In that sense, driving forces is a large portmanteau phrase used to describe anything that is strong enough to affect the direction of the future.*' (Int #1).

Finally, according to the data and as briefly stated in the above passage, driving forces come at different levels of granularity, or in other words, the term driving force was also used to refer to forces that drive other driving forces. This research indicates that many participants seek to better understand a driving force by seeking to unravel the forces that drive the higher-level driving force. For example, in one case of scenario planning project that the researcher examined, one of the key driving forces was

privatization. The scenario development team, under the guidance of the scenario planning expert, sought to unravel and better understand what is driving the driving force of privatization. One of the forces that drives the driving force of privatization was the government budget deficits. One interviewee used the metaphor of double clicking on a folder in a computer to reveal the files contained by the folder. By double clicking in a driving force, other driving forces are revealed.

iii) Predetermined elements

Predetermined elements were most prominently evident in the material (Shell and GBN reports and videos) that the researcher examined, rather than in the interviews with the scenario planning experts. One definition of predetermined elements can be found in a GBN presentation: predetermined elements are '*forces of change that are relatively certain within the relevant timeframe, such as population aging*' (GBN, 2009). Predetermined elements were also described as forecasts that are made with some degree of confidence. In an unpublished video presentation of scenario planning that the researcher studied, Pierre Wack (n.d.) distinguishes between four different types of pre-determined elements:

- Elements which are already in the pipeline. For example, regulatory policies coming in effect after some years.
- System predetermined element*s*. According to Pierre Wack and as also stated in Shell internal reports, some predetermined elements are not immediately obvious and can only be revealed by closely examining the underlying system, the forces and their interactions.
- Slowly changing elements. Common examples include demographic change, long running experience curves, and technology deployment among others.
- *The impossible:* It was frequently argued that one of the important objectives and benefits of scenario planning is to reveal and discard what cannot happen. Typically, this is achieved by demonstrating that the underlying conditions necessary for something to happen are impossible or nearly impossible.

While Pierre Wack placed tremendous emphasis on identifying predetermined elements, the same degree of importance was not reflected in the interviews with

scenario planning experts. Most of the participants of this study did not mention predetermined elements unless the researcher specifically inquired about them. Some interviewees argued that the only pre-determined elements are the obvious ones, (e.g. climate change, demographics) and it is difficult or impossible to make any other forecasts with a good degree of confidence. A few interviewees claimed that in their career only a few predetermined elements that were identified in a scenario planning project actually materialized. Finally, some interviewees stated that predetermined elements are also surrounded by uncertainty. For example, while climate change might be taken for granted, however, the form of climate change, how quickly it happens and how it is going to impact the area of interest remains largely uncertain.

iv) Critical uncertainties

The researcher identified in the data three core characteristics of critical uncertainties and suggests defining the concept of critical uncertainty based on these three. In summary, the three core characteristics are: i) critical uncertainties refer to aspects of the external environment that are beyond the control of the client group, ii) critical uncertainties express something the scenario clients would like to know about the future but is considered unknowable, iii) critical uncertainties are developed around the issues of concern of the clients and are critically important for them. Each of these three core characteristics are described in detail below.

In the external environment, beyond the control of the client group

According to the data, critical uncertainties refer to and indicate aspects of the external environment that are beyond the control of the client group. In line with the conceptualization of the external environment that was presented in section 4.2, establishing the scenario focus, some interviewees claimed that only elements of the contextual environment should be designated as critical uncertainties, while other interviewees also included elements of the transactional environment as well. In all cases, designating an issue that is within the direct influence of the client as a critical uncertainty was considered a methodological fault that would lead to project failure.

Unknowable

According to the data, critical uncertainties refer to and express something that the scenario clients would like to know about the future external environment. In this research, critical uncertainties were most often expressed as future oriented questions. For example, the critical uncertainties in the Long-Term Scenarios – Oil (Shell, 1988, p. 10) are:

- "*Will energy markets become less oversupplied and therefore 'recover' from current weakness?*"
- '*When markets recover and oil is the trend-setter for all energy prices, will producers regain lasting control over the oil markets?*'

However, in all cases scenario planning experts explained that it is extremely difficult or even impossible to know with some degree of confidence the future outcome of a critical uncertainty. In addition to that, there is evidence in the data of some form of comparison between outcomes that are *unusually*, *highly* and *genuinely uncertain* and other simple uncertainties. For example, in descriptions of the scenario development process in GBN reports (2008; 2009), critical uncertainties are identified by ranking driving forces in terms of uncertainty (high vs low). In the Shell related data, many interviewees used terms like *genuinely uncertain* or *genuinely un-knowable* or phrases like '*only a little God could know what happens*' (Wack, n.d.) to refer to critical uncertainties. In some cases, critical uncertainties were described as one-dimensional variables with clear future outcomes (e.g. GDP growth 2% or 7%), the outcome of which was however considered impossible to forecast with some confidence. In other cases, critical uncertainties were open-ended questions whose outcomes are not immediately obvious (e.g. 'What is the future of [country] lives through 2025?').

Finally, one senior scenario planning expert strongly questioned the use of the term *uncertainty* and suggested the use of the term *unknowable*. His rationale can be seen in the below short abstract:

'*As to where is the uncertainty, because a lot of elements are uncertain, but uncertainty is better understood in terms a formally described model where you can do analysis. … So, I am not quite sure the word uncertain is the best word. It would come up if you are looking at real option analysis. … But then there are the unknowable, selected things, you can't really do an analysis. … Uncertainty works extremely well when you have formal structures, where you have outcomes that could be here or here. You do analysis… By and large, the frameworks that we develop, the problems we are dealing with in scenarios, there is no single formal structure. We were talking about, maybe the language is wrong, about archetypes…*' (Int #3).

Since interviewees overwhelmingly presented critical uncertainties as '*something the scenario clients need to know',* which however is perceived to be extremely difficult to be known with some degree of confidence, the researcher proposes the term *unknowable* as the second characteristic of critical uncertainties.

Relevant to the clients

Participants of this research very often used expressions like '*what matters the most'* or '*the <u>most important</u> un-knowable elements in the problem'* or *'the <u>absolutely critical</u> questions which are around'* to describe critical uncertainties (underlined by the researcher for emphasis). Critical uncertainties where also directly linked them with the clients' *issues of concern*. Specifically, most of the interviewees argued that the reason a client is concerned about a specific issue is because underlying the issue there is something that the clients are wondering about and they do not know the answer to. According to the data, scenario planning experts use the issues of concern of the clients to identify critical uncertainties. Whenever the researcher asked an interviewee to justify the selection of specific critical uncertainties, the answer was almost always something along the lines '*this was the most meaningful for the clients*' or '*had the most value for them*'. In many other cases, the term critical uncertainty was used to refer to those elements that are expected to have an '*unusually high impact'* on an area of interest to the scenario clients (e.g. the business, or client organization). Among the many unknowable uncertainties, the critical uncertainties are the ones that are the most important in relation to the client. Finally, some interviewees connected critical uncertainties with the idea that scenarios must be <u>relevant</u> to the client of the project. Based on the above, the

researcher proposes *relevant to the clients of the scenario project* as the third core characteristic of critical uncertainties. Some of the above points are vividly illustrated in the below statement from one interviewee.

> '*The branching points were an issue almost from the very start of the process. Because by discussing branching points, one is addressing the most basic question of all: Which are our most profound and far-reaching uncertainties? Which questions would we most of all like to answer? What do we think is, in the long term, at stake for our business, and which structural changes will impose the largest transformations on our industry? These questions have, already in the interviews, always played a role in the background, because the scenarios do not have to be correct or true, but they have to be relevant. The branching points showed immediately what the scenarios considered the decisive issues for the oil and energy industry.*' (Int #5)

v) Introducing novelty

According to the data, a major aspect of examining the external environment is introducing *novel ideas and thinking*. Participants of this research described and defined novel information as information that '*contains an element of surprise*' or *'seems completely counter-intuitive*' or is '*beyond expectation*' or constitutes '*a brand-new way to examine the situation*' in relation to the clients or will transform their thinking. It is expected that this novel and surprising information will stimulate and stretch the clients' thinking. Interviewees explained that novelty is client specific, i.e. a set of ideas might be considered as well established and not original for one group of people, while the same ideas might appear as exceptionally novel and original for a different group of people.

vi) Credibility

In all cases, participants of this study strongly argued that the results and outcomes of examining the external environment need to be perceived as *credible*. Examining the external environment in scenario planning does not only involve bringing information to the client that is credible, but also looking for evidence that support the credibility of the new information. For example, in one case that was examined, a novel idea was brought up during the development of scenarios. Following the scenario development workshop,

the scenario planning expert conducted research to determine if the new idea was credible and to gather facts and evidence to support its credibility.

4.3.4 Individuals as sources of knowledge and information

This research indicates that scenario planning experts carefully select and invite individuals to participate in a scenario planning project based on their knowledge and understanding of the external environment and in relation to the focus and purpose of the project. These individuals may get involved in different capacities in the project and fulfil different purposes. For example, an individual might be invited to give a one-hour presentation to the scenario development team about a topic of interest or to become a member of the scenario development team that will participate in the workshops and actively develop the scenarios. Such individuals were sometimes described and portrayed as *embodied research*, i.e. research that takes the form of a person. Instead of asking participants to read a research paper or a book, a person who carries the same knowledge and ideas is brought into the process to either give a presentation and answer questions or to actively participate in the development of scenarios. Many participants argued that it is much easier to introduce novel ideas and understanding in the process that will find their way in the scenarios through such individuals. In addition to the above, this research indicates that the scenario planning expert is also a most important source of information and knowledge in a scenario planning project. In this section, the researcher elaborates on the role of the scenario planning expert, the scenario development team and remarkable people as sources of information and knowledge in a scenario planning project.

The scenario planning expert

This research indicates that scenario planning experts rely on their own knowledge and understanding of the subject area in relation to the focus and purpose of the scenario project (e.g. the energy system, technology, strategy) in order to effectively guide the clients and the scenario development team. Participants of this study provided examples where they used their own knowledge and understanding to identify the blind spots of the clients, to uncover the assumptions, beliefs, axioms of the clients and the scenario development team, to evaluate which of those are fundamentally important and which require less attention, to formulate and suggest focal questions, to figure out appropriate

questions for the research agenda and to suggest and introduce relevant sources of information in the scenario process among others. Some participants of this study directly claimed that the scenario planning expert should have this knowledge and further argued that it is critical for the success of the project. To demonstrate the latter point, a brief abstract is included below.

'*So, you can't discount the value of having an informed facilitator. I think that when facilitators reshuffle what people already know, without contributing their own knowledge, you do not get much insight. So, I think that is part of what is valuable about having people who understand the subject. Which we do not tend to talk about very often.*' (Int #1)

The scenario development team

All participants of this study stated that one major factor for determining the composition of the scenario team is the knowledge and understanding (either tacit or explicit) that potential members of the team have. This research indicates that scenario planning experts carefully select and invite individuals to become members of the scenario development team based on the knowledge and understanding they have and can bring in the process. Many participants explained that they carefully design the scenario development team so that the necessary knowledge, insights and ideas are included in the process through individuals who carry them. However, the above does not mean that knowledge is the only reason for inviting and including a participant in the scenario team.

Remarkable people

All participants of this research insisted that a critical factor for the success of a scenario planning project is introducing a remarkable person. The research sought to better understand who a remarkable person is, their core characteristics, and the role they play in a scenario planning project. According to the data, the term *remarkable person* is used to refer to those people who are introduced in the scenario planning process for the following two interrelated purposes:

- to introduce *novel information* (thinking, ideas, insights, interpretations and perspectives) in the scenario planning process

- to *challenge the assumptions and beliefs of the clients*

Both in the context of remarkable people, but also elsewhere, participants of this study referred to the above two purposes in conjunction to each other i.e. that the novel ideas challenge the clients' current way of thinking and vice versa. To support the above, statements from two highly experienced interviewees are provided:

'*Just on remarkable people, who is remarkable kind of depends on... remarkable to whom? So, I was in a training exercise at GBN and we had a civil servant from Singapore and a civil Servant from Scotland. And I can't remember what it was, but the civil servant from Singapore, because of his experience, became a remarkable person for the one in Scotland. Because his perspective was different from hers. So, remarkability, is context dependent in effect. And I think it is not just knowledge, the word I like to use is challengers. … I do not like the word expert because that implies specialized knowledge. So, it is who is going to make you think differently about what you always assumed. That's all that role is. And that can come from anywhere really. So, it could come from someone with no education at all. He wouldn't be considered an expert on anything. But that is only my view of the matter. As you noted, no research, just experience. To a certain extent it is semantics. But if you look at what is the role that these people are playing, that is the more important thing. It is their function in the process. … I think make you think differently, challenge your assumptions, to bring a perspective you might not have had before, which is all part of thinking differently, I think to be strange and novel. Which could come from anywhere. … But, practically speaking, it is just anybody who shakes you up a bit. … People who are just looking at the world in a completely different way, and therefore your own assumptions about how the world works do not add up anymore. … This is why people are still resisting, because it is just too challenging to our notions of how the world works.* (Int #1).

Interviewee #3: '*Now to come to the point, remarkable people are carriers of ideas, insights, which are generally not found in the consensus in the common set of clichés that are used to describe the world. They provide an opening to better understand the world, and provide content, material, raise questions for scenarios. And scenarios then become*

the ultimate carrier of these new insights and ideas in a form more easily digestible. Because they are narrative, and they have behind them some credible analysis.'

Researcher: '*So they bring brand new insights...?*'

Int #3: '**SEEMINGLY** [strong emphasis in his voice] *brand new. For many in the people in the organization, they are brand new and they underpin a different way of looking. They provide an alternative way of making sense.*'

Interviewees explained that introducing new thinking and challenging the clients' way of thinking are two fundamental objectives of most scenario projects, a subject that is extensively covered in section 4.5. It was often argued however, that it is very difficult or even impossible to get fundamentally new ideas from within an established group of people. Whenever it is required, the task of introducing new thinking can be accomplished by introducing remarkable people in the scenario planning process. Further to that, and as highlighted in the above statements, the novelty and challenge that remarkable people bring is *audience specific*, i.e. a set of ideas might be considered as well established and not original for one group of people, while the same ideas might appear as exceptionally novel and original for a different group of people. Participants of this research then framed the objective of introducing novel ideas in the scenario project as the search for and the identification of people who have novel ideas. These people are then brought into the scenario process. The introduction of remarkable people was considered a major source of novelty in scenario planning process (but not the only one) and some interviewees claimed that it is a necessary ingredient for success. In addition to the above two statements, another interviewee's words provide more insight:

'*So called remarkable people …. And we say it is impossible to get any new ideas into scenarios from within the group. However, it is very easy to get new ideas into the room, just bring somebody from outside the group.*' (Int #4)

Interestingly, interviewees insisted that remarkable people are not *necessarily* extraordinary individuals or have impressive skills. In many cases, remarkable people were individuals whose ideas (that are perceived as novel by the clients) were simply

developed as part of the circumstances they were found in and were otherwise considered as very ordinary individuals. However, scenario practitioners added that it is possible that the novelty of the ideas is due to the extraordinary thinking skills of some remarkable people. For example, one remarkable person who was often described as an exceptional individual is Amory Lovins. The below statement is another indicative example of a remarkable person who was otherwise considered an ordinary person:

> *"But we did a project for the government of* [Country] *looking at salmon fishing. And you would think that wild caught salmon would always be better than fish farm salmon. Fish farming is not even legal in* [Country] *or wasn't at the time I did the project. But the* [Country] *supermarket would not buy in many cases the wild caught salmon. So why would that be? Are they just….? What is it? So, we actually got the chief buyer of a* [Country] *super market chain to come to the workshop to explain in person what they buy. And the reason was because they go out and fish for two or three weeks and they catch the fish and they put them in the bottom. These boats are just like buckets. And the fish that go into the bottom after two weeks are all squashed and in not very good condition. And if the supermarket places an order to a fish farm, they put the electric shock in and they put them on ice and the fish are completely fresh. Very different physical condition. The wild salmon might be nutritionally better or taste better or whatever, but they haven't been handled very well. Rather than us, the scenario planners, trying to tell the government of* [Country] *that, we got someone with obvious authority. Who better than the supermarket buyer that they have never met before? So, he comes in and he explains why and they go 'Ah… OK, what are going to do about that?'. So, its again this function of explanation, the story teller gives you an explanation for a certain kind of future. The future where no one wants wild salmon anymore. Which is unthinkable... How they might not want wild caught salmon?"* (Int #2)

The above statement also highlights another important characteristic of remarkable people. In almost all cases that were examined, interviewees emphasized that *credibility* and *neutrality* (also expressed as *being unbiased* or *not having a stake in the scenario project*) were highly desired or even absolutely necessary characteristics for a remarkable person, if the novel and challenging ideas are to be accepted by the scenario clients.

Because novelty is context specific and remarkable people have to be credible, interviewees argued that remarkable people will almost always be people from outside the client organization. In only two cases that were examined the remarkable person was someone from within the client organization.

Related to the above, the data indicate that remarkable people can play another important role in the scenario planning process: give credibility to novel and challenging ideas and thus increase the probability of the idea being accepted by the scenario client. Specifically, interviewees argued that they strongly prefer to have a remarkable person introduce the novel idea to the client (rather than the scenario planner doing that himself).

Participants of this research strongly differentiated experts from remarkable people since remarkable people serve a different function in the scenario planning process. A remarkable person might be considered an expert (having specialized knowledge), but an expert in a scenario project does not necessarily fulfil the same function as a remarkable person.

4.3.5 Conclusions

A most important finding of this study is that scenario planning experts along with the scenario development team examine the external environment. In this practice, as defined by the researcher, the focus is on examining the past and the present rather than the future. At the core of the practice of examining the external environment lie three fundamental questions that, according to the data, scenario planning experts seek to answer: i) How does the relevant part of the world work?, ii) What are the critical issues that will shape the future of the clients' business, industry, or in general the subject of interest? iii) What is critically uncertain? It is a process of searching for novel ideas and new ways of understanding the external environment, but it is also a process of searching for evidence and hard facts that would give credibility to the work conducted and its outputs. A most important outcome of examining the external environment is the construction of a foundation for the development of scenarios in the form of scenario building blocks, namely theories how the world works, driving forces, critical uncertainties and predetermined elements. In addition to the above, the scenario

planning expert, the scenario development team and remarkable people are important sources of information in a scenario planning project. Based on the data, the researcher also clarified and demystified the concept of the remarkable person. Finally, the finding that scenario planning experts examine the external environment and conduct research and analysis portrays scenario planning as an analytical and intellectual process, an argument that was also frequently made by all the participants of this study. Table 11 provides an overview of the theme and shows which cases support the findings presented in this section. Table 12 serves as additional evidence that demonstrate the prevalence of the theme in the data.

Theme and subthemes	Supporting cases
Examining the external environment	All participants
o Searching for theories of how the world works	All participants
o Searching for driving forces	All participants
o Searching for pre-determined forces	All participants
o Searching for critical uncertainties	All participants
o Introducing novelty	All participants
o Ensuring credibility	All participants

Table 11: The theme examining the external environment, along with the cases that support the findings.

Int #1	*So, we tried to find out what the research issues were and then commission the research to answer the questions that people were coming up. So, we developed a research agenda out of the discussions of the first workshop and so the whole first workshop was 'what are the things that we need to understand better?'. And in [project name] we had a very clear research agenda which included things like 'What's the US relationship with the outside world?'. It was a set of issues like that. … So that's where the research agenda came from.*
Int #2	*And you are trying to bring these ideas into the process, that's what the research is really about. You are looking for remarkable people, that's why the Pierre Wack remarkable people. They brought this new perspective, they brought the explanations, they had that aspect. It hasn't just objective horizon scanning, you know, these things are happening, but if you ask somebody else those things are happening, but that's boring. The real thing you should be looking is that thing*

	over there. Why do you think of that? Well, because I have a totally different way of seeing the situation. That's really the research. And that shifts values. That opens you up to new scenarios, which then give you a change driven. This is opening up to the alternatives, which is really important in the case of the systemic challenge.
Int #3	*And good research, it can be research as research paper, it can be a case study as an example, it can be particular data collection, it can be new sorts of knowledge. How do you decide what to research? I think you have to go back… First of all, let me start at the full circle. When you end a scenario, and in Shell, we do scenarios every three years, when you end a scenario, you present the scenarios at the board, and it starts to get used at the company, you should be monitoring what changes are going on. And that monitoring helps you, helps you to begin to put together an initial research agenda.* […] *So, part of your research is indicated by changes in the ongoing environment, that are not adequately accounted for in the last scenario. A second area that defines research data collection* […]
Int #6	*And by having two different ways of engaging with scenarios, you get a richer understanding. The systems map and the story map relate to each other, but they are not the same thing. Some people are better story tellers and some people and more intuitive system thinkers, and it allows you to gather different communities of knowing together, to create shared understanding.* […] *I do not know any effective scenario practitioner who doesn't use systems thinking at the same time. I can't imagine how you would do scenario planning without having systems thinking.*
Int #7	*The driving forces by definition are the part of the system we are trying to understand. These are just two levels of granularity. The system as a whole, is bigger than any driving force individually. And so, one of the first things in system thinking, when we talk about the system, you try to scope it and you say, when we describe a system, when do we think we have actually described the system? Well, for instance, if I have a pendulum, a mechanical system, well, what is the system? When do I have a good description of the system? When I actually describe the position of the pendulum, and the speed of the pendulum. With two variables, I can completely describe the state of the system. So, the challenge in*

	scenario thinking is of course to say 'What are all the variables, I need to say something about, in order to have a good description of the system?' And that's part of the search. To actually say what needs discussing, so we get a good understanding of the system? And of course, it is not in the exact sciences like physics and chemistry, we can be much more explicit and exact in what are the variables needed to describe the system fully. In scenario thinking, it is a little bit more fussy, it is a discovery, it is like you need to do generative work in order to really capture and understand what are all the variables I need to talk about, to have a good understanding of the system.
Int #9	*For me, exploratory scenarios are really about helping groups or individuals develop insights about how a particular situation is changing, or maybe just the fact that it is worthwhile thinking about a particular situation in a different way, particularly around the concept of uncertainty and so on. … And the point of those is basically to say 'we do not know much about this whole area, the contours of this area at the moment; let's use scenarios to just develop insights that may help us frame the challenges a little more'.* […] *I think in an exploratory process you spend most of the time in interviews and research and the framing up of the scenarios and writing the scenarios and try to get them into a sense in which 'oh my God, this was a confusing situation, we now have something that gives us some interesting frame' as we described earlier.*

Table 12: Additional evidence demonstrating the prevalence of the theme *examining the external environment* in the data.

4.4 Developing scenario sets

4.4.1 Introduction

The fourth theme that the researcher develops and suggests based on the data is *developing scenario sets*. While the focus of examining the external environment is primarily the past and the present, the development of scenario sets seeks to answer the question '*What may happen in the future and why?*' (in relation to the subject that the scenario planning project is focusing on). It is a process of synthesis, of using and integrating all the information gathered and produced during examining the external environment into coherent wholes that are useful to the clients. Using a metaphor that according to anecdotal evidence is attributed to Pierre Wack, examining the external environment can be thought as the *breathing in* while the development of scenarios can be thought as the *breathing out*.

The development of the scenario sets typically starts during a workshop that is called the scenario development workshop. The scenario team under the guidance of the scenario planning experts and the facilitators of the workshop develops fragments and elements of the scenarios. The scenario planning experts take all the material produced by the scenario team and, based on that, fully develop the scenario set. The scenario set is presented to the scenario team in a second workshop which is often called the *affirmation workshop,* where the scenario team makes amendments and finalizes the scenarios.

The focus of the first four sections (4.4.2 – 4.4.5) is on the development of *scenarios*. A most important finding of this study is that scenario planning experts seek to explain why and how the future conditions described in a scenario may come about. This explanation constitutes the *scenario logic*. All participants of this research considered the scenario logic (Section 4.4.2) as a fundamentally important and defining element of a scenario and one of the main differences that distinguishes a scenario from a story or a description of a future. This research also identifies in the data three aspects of developing scenarios from an analytical perspective, namely developing sequences of causally linked events (Section 4.4.3), creating internally consistent combinations of end states for each focal issue (Section 4.4.4) and organizing information around an

organizing concept (Section 4.4.5). Based on these three aspects the researcher delineates and defines three techniques that scenario planning experts use to develop scenarios. It is important to note that these three aspects and techniques are not mutually exclusive, but scenario planning experts may employ all three of them in the development of scenarios.

The focus of sections 4.4.6 and 4.4.7 is on the development of *scenario sets*. According to the data, a scenario set is not merely a collection of stories about alternative futures. This research indicates that scenario planning experts actively seek to develop the *structure of the scenario* set that indicates the questions that the scenarios attempt to answer, how the scenarios are different among themselves and also arranges the scenarios in a specific order. Participants of this research also distinguished between what they called the inductive and deductive approach, referring to the interplay between the development of the structure of the scenario set, the critical uncertainties and the scenario stories. While these two approaches are also mentioned in the literature, at the time of writing they were not clearly defined or even adequately described. The researcher formally defines these two approaches based on the data.

For reasons of completion, the researcher would like to note that participants of this research often referred to properties of high-quality scenarios, namely plausible, challenging, relevant, credible, internally consistent and divergent. However, these properties actually emanate from more fundamental principles that were already covered or will be covered in other sections of the findings chapter. For that reason, these properties will not be examined here.

The rest of this section is structured as follows. The researcher presents the findings related to explaining why and how a scenario might come about and develops the concept of the scenario logic in section 4.4.2. The three techniques for developing scenario sets are the subject of sections 4.4.3, 4.4.4. and 4.4.5. The structure of the scenario set, and the inductive and deductive approaches are covered in section 4.4.6 and 4.4.7 respectively. Finally, conclusions can be found in section 4.4.8.

4.4.2 The scenario logic

A most important finding of this research is that scenario planning experts always seek to explain why and how the future conditions that are described in a scenario may happen. This explanation was often referred to as the *scenario logic* and according to the participants of this study it constitutes a fundamentally important and defining element of a scenario. A description of future conditions is not the same as and does not necessarily include an explanation of why and how this particular future might happen. This distinction between merely describing some future conditions and explaining the how and why was strongly emphasized by many participants of this research. One example of this distinction can be found in the below abstract. In a video presentation, Pierre Wack is distinguishing between an alternative future, and a scenario where '*the emphasis is really on understanding how and why a situation develops'.*

'*What is a scenario? It is not merely an alternative future. It is not merely the price of oil could be $40 or could be $10. This is useless. Or a sensitivity test. You know, a baseline with a high and a low. Or an interesting story of what could happen in the future. The emphasis is really on understanding how and why a situation develops. When I had scenario presentations in Shell, usually the presentation lasted three hours. Four fifths of the time was spent on analysing the force that drive the scenario. And the scenarios themselves could be exposed in twenty minutes. The key element was really understanding the force who were behind the outcomes on which the scenarios were focusing.*' (Wack, n.d.).

As it is also evident in Pierre Wack's statement, all participants of this research considered the scenario logic as an absolutely necessary and defining aspect of a scenario. Scenarios that only describe alternative futures without providing this explanation were often described as '*useless',* '*nonsense*', '*superficial*' or where not considered as scenarios at all. In all cases, participants insisted that they actively seek to develop the logic underlying a scenario and make it clearly visible to the recipients of the scenarios, most typically through an influence diagram or other visual means. In the below short abstract, the scenario planning expert narrates a recent scenario project, where he/she was actively seeking to find an explanation for an alternative future that that the scenario team had developed. The researcher underlined some parts of the abstract for emphasis.

Figure 4 serves an example of a scenario logic from a real-life scenario project. The specific figure depicts the logic that underlies the *Roller Coaster* scenario, from the Shell Oil Scenarios set (Shell, 1986b, p. 15).

> "*When I was working in* [name]*, we had a workshop where people came up with the stories they wanted. And I then went back to the office the next day and tried to figure out what's the sequence of events, why does this come about. And one of the stories was highly aspirational, highly normative. And I couldn't see how you got from where we were today to that scenario. So, I made up a kind of elaborate influence diagram, what led to what, and had to slop in pieces of the puzzle to make it plausible. When I then presented it, people threw me out of the room. They said: 'We do not recognize this, this is not our work'. I said 'Fine, just tell how it happens, you do not have to use my arguments. But I have no explanation of why this takes place. Give me an explanation why it takes place'."* (Int #1)

It is important to note that the term scenario logic was used primarily to refer to the explanation of why and how a future may happen, but on a few occasions to refer to the principle that organizes the various pieces of information in a scenario. To clearly distinguish between these two, the researcher from this point on will use the term scenario logic to refer to the explanation of how and why a future might come about, and the organizing principle to refer to the principle(s) that organize information in a scenario. Most typically, the explanation of why and how a future might come about effectively organizes the information in a scenario, however, this is not always the case.

Participants of this research argued that it is not sufficient to only develop an explanation, but the quality of the explanation is also an important factor. One aspect of this is that the explanation must be credible and one that the audience can believe. To that end, scenario planning experts gather *facts* and *evidence* that support the credibility of the explanation. Many interviewees argued that even if a proposition appears to be believable, the explanation cannot be considered credible without the necessary evidence to support it. However, participants of this research often provided accounts of scenario cases, where the audience refused to accept what the scenario planning experts considered facts and hard evidence. According to the interviewees, the perceived

credibility and believability of scenarios and their explanations is not necessarily a rational argument, but there are a number of other psychological factors that influence whether the scenario and the scenario logic will be accepted by the audience.

Figure removed for copyright reasons.
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Figure 7: The logic that underlies the *Roller Coaster* scenario, adapted from the *Long-Term Scenarios – Oil* unpublished, internal report (Shell, 1986b, p. 15).

Linking the past and the present with the future

Most importantly, participants of this research described an explanation of a future as a *rational argument* that is directly connected with *understanding how the relevant part of the world works.* According to the data, this understanding is gained by examining the

external environment. Interviewees used a variety of terms such as *conclude, deduce, project, predict, draw implications* to refer to the activity that connects the understanding of the present and the past with the future and constitutes the explanation. The below two short passages are indicative of some of the above points.

'*No, because you do need to have a structure, because in a sense - we could call that scientific - we are assuming that we have dug in - this is what makes a difference from manipulation. We have really found something important, which is true, like these things. This is important. Suppose we know it is true, there really is that relationship, this is an insight, a deep insight into the structure of the system. So, from that we can draw implications … So now we are going to use the system structure to explain, our explanation is based on … So, it is more kind of deeper understanding, we are explaining some sort of deeper understanding which is predictive.*' (Int #2)

"*So, the brief I give them between scenario workshops is 'Take the systems iceberg, I want you to look at this driving force and give me the events level information. Then identify what patterns of behaviour do you see over time, related to this key driving force'. … The brief is take the driving force, use the iceberg, jot down to the structure, come back to the next workshop and tells us how it works, how the structure is, how do you understand it, and then tell us the two or three or four different ways, that this can play over the scenario period. And why. So, I force them to firstly understand how it works and then give us pieces of the scenarios. So, if the scenario period is over the next ten years, then I want you to tell me how this plays out over the next ten years.".* (Int #4)

The importance of explanation

Evident in the data are two reasons why explaining how and why a future might come about is considered such an important and defining aspect of developing scenarios. Firstly, and as it is also briefly mentioned above, interviewees directly connected explanation to *plausibility* and *credibility* and to *persuasive power*. Specifically, explaining why and how a future might come about increases the possibility that the recipients of the scenarios perceive the scenario as plausible, compared to a scenario that lacks logic or its logic is superficial. The second reason is also mentioned above. In his definition of scenario planning, Pierre Wack states that the key element is '*understanding the force*

who were behind the outcomes'. One of the fundamental objectives of scenario planning is to *enhance the clients' understanding of how the relevant part of the world works*, not necessarily referring to the future, but to the past and the present. Explaining why and how a future might come about is based on exactly this understanding of how the relevant part of the world works. A lack of an explanation or a very shallow explanation of future conditions was considered as a sign of lack of or superficial understanding, which defies the purpose of developing scenarios. The below short abstract from an interview with a highly experienced scenario planning expert serves as a representative example of how some of the above findings were evident in the data.

Interviewee #6: '*Yes, I do not* [develop scenarios with only descriptions of the future] *at all. Because I think it is nonsense.'*

Researcher: *'Nonsense?'*

Int #6: '*Yeah basically. I think if there is no systemic logic, then there is no plausibility.'*

Res: '*No systemic logic, no plausibility?*'

Int #6: '*Because it is the systemic logic, that the ability to use a rational argument, a logic of cause and effect that tells you whether the scenarios are plausible or not.*'

4.4.3 Causally linked events – the snippets technique

Throughout this study, participants of this research often described the actions they take in order to develop scenarios. An important pattern that the researcher identified across these descriptions is that, in order to develop scenarios and more specifically in order to develop scenario stories (plots, narratives), scenario planning experts seek to develop sequences of events that are linked together through a logic of causation. Small strings of causally linked events (typically three to five) were often called *snippets*. In some cases, participants of this study referred to the development of such sequences of causally linked events as the *snippets technique* or the *snippets approach* but in other cases it was not given a specific name. In a few cases it was also presented as the standard approach to developing scenario stories. Based on the data, and the commonalities among the

various descriptions of the development of causally linked events, it is possible to define the *snippets technique* and the main steps involved. The snippets technique is evident in many cases of scenario planning experts and in both Shell and GBN reports. A very detailed description of the technique can also be found in the Manager's Guide to Practical Planning in Shell report (Shell, 1995). In this study, the snippets technique was described as an activity that takes place during the scenario development workshop, where the scenario team develops the scenarios under the guidance of the scenario planning experts and workshop facilitators. The researcher would like to highlight that the snippets technique is a technique of developing primarily scenario stories (compared to descriptions of future conditions). According to the data, the snippets technique is not necessarily mutually exclusive with other methods or techniques that are used to develop scenarios. Participants of this study often described using the snippets technique in combination with other methods and techniques, e.g. the GBN 2x2 matrix method or the combinatorial technique. Based on the data, the main steps of the snippets technique are presented below.

Initially, the scenario team is asked to brainstorm events that may happen between the present time and the horizon year. The scenario planning experts might give the scenario team specific tasks or prompts to help the scenario team brainstorm such events. For example, in the case that a 2x2 matrix has been created, the scenario team might be asked to brainstorm events for each of the quadrants. Following the brainstorming of events, the next task is to develop snippets, i.e. small fragments of causally linked events, typically consisting of three to five events. This can be achieved by asking the scenario team to arrange the existing brainstormed events in sequences and connect them with a causal logic, or by asking the scenario team to indicate why an event may happen and what it may lead to. Some practical guidelines for developing snippets can be found in the *Manager's Guide to Practical Planning*, and are listed below (Shell, 1995, part 5, p. 2):

- *'Fragments must contain at least three events'*
- *'Event must be causally linked'*
- *'No events may describe action by the company'*

- *'The test is plausibility not possibility'*
- *'The first event need not happen soon'*
- *'The last event need not happen in the horizon year'*
- *'Story lines can branch'*
- *'Story lines should address the key variables'*
- *'Don't grind axes or ride hobby horses (no advocacy)'*
- *'Be original and novel and push back the frontiers'*

At that point, the scenario team would most probably have generated a large number of snippets. The next step is to examine the snippets, how they relate, look for areas of similarities and differences and organize these in larger sequences. In some cases, this examination of the produced snippets is performed by the scenario planning experts offline, while in other cases this task was assigned to the scenario team during the scenario development workshop. In a similar manner, these larger fragments, sometimes called storylines, are further examined and then organized into scenario stories and scenarios.

The finding that scenario planning experts develop sequences of causally linked events indicates an important idea. Scenario stories and scenarios consist of and can be viewed as sequences of events that are ideally linked through a logic of causation. Some of interviewees directly made this claim and further argued that scenario stories by definition consist of such sequences of events. Therefore, in order to develop scenario stories and scenarios, one necessarily needs to include events arranged in such sequences. While this can be achieved by asking people to tell stories about the future, the snippets technique is a technique that refers to causally linked events explicitly. Based on the above, it is also possible to distinguish between scenarios that only describe alternative future end states and scenarios that include sequences of events. To demonstrate how some of the above points were evident in the data, an abstract from an interview with a participant is included below.

Interviewee #7: *'Scenarios is all about information and about a changing world, right? And information comes at different levels of granularity. And the lowest level is really*

events, staff that happens, if you put them together in causalities, that's what they call snippets, and if you put different snippets together, you start having storylines, and a set of storylines, makes a scenario. To the extent that you covered the whole time range, the time horizon that you want to cover and you talk about the various kind of dimensions, political, social and so on, that you want to cover.

Researcher: '*So if I understood correctly, snippets can be both in the top down and the bottom up approach?*''

Int #7: '*Not only can be but have to be. Because it is part of building the scenarios. So, whether I use a top down or bottom up approach, at some point, I will talk about events, I will talk about how they are causally related, and by definition, when I have several causally linked events together, those are snippets, that's what the definition is.*'

4.4.4 The combinatorial technique

The second technique that the researcher develops and suggests based on the data is the *combinatorial technique*. Similar to the logic underlying the identification of the snippets technique, the researcher discovered that, in some cases, there are striking commonalties among the actions that scenario planning experts take to develop scenarios. It is therefore possible to delineate and define a technique that scenario planning experts use in the development of scenarios. One of the participants referred to is at the *combinatorial approach*, another participant described it as a tool named the *matrix of multiples*, while other participants did not give it a name or identify it as a tool, method or technique, however, they essentially described the same actions and steps. The researcher distilled from the data these actions and steps and formally defines it as the *combinatorial technique*. This technique was only evident in the cases of participants that were deeply exposed to the Shell tradition of scenario planning. The technique is carried out in the scenario development workshop, once the scenario focus and the set of issues that the scenario project examines have been established, and hopefully following a period of research and analysis of those issues. The main steps of the technique are described below.

The first step of the combinatorial technique is to identify end states in the horizon year for each of the focal issues. Participants of this research stated that they typically identify three end states for each issue, with each end state being a rich description of the issue, along many dimensions and variables. In only one case, the interviewee explained that these issues need to be expressed as one-dimensional variables, with two polar outcomes. Once the end states have been developed, the next, second step involves arranging the end states into internally consistent combinations, and thus creating several *scenario outlines*. Some end states will match harmoniously with others, while the combination of other end states will be fundamentally incompatible. It is expected that this process will produce a significant number of scenario outlines, much higher than two, three or four, which is the number of scenarios that are typically produced. The next, third step is to reduce the number of combinations/scenario outlines to a number that is easier to manage and so that each of the scenario outlines can be considered in deeper detail. In order to achieve this, some of the participants referred to a process known as *clustering,* while in a few cases, the scenario planning expert simply used his judgement to select those outlines that he or she considered that they would be most useful and interesting to the clients. The process of clustering involves closely examining the scenario outlines with the intention of identifying areas of similarities and divergences. Based on these areas of similarities and divergences, the scenario outlines are then clustered together into a smaller number of groups. These groups are essentially prototype scenarios that need to be developed further. To demonstrate how the combinatorial technique was evident in the data, the following abstract from an interview is included below, serving also as a vivid first-hand description of the technique. Figure 5 shows the matrix of multiples tool, as found in one of the participant's personal notes. This tool serves as evidence of the existence of tools other than the 2x2 matrix.

"*Now imagine I have GDP growth 2% on the left and 8% on the right. Now I have the same thing for eight other uncertainties. I have stable, unstable, I have cold, warm, whatever. Now the combinatorial approach, says 'where would it lead me if I take 2% in a cold climate, in an unstable political environment?'. This is one combination. And you can see that if you have eight variables and each variable has two possibilities, you have many combinations that are possible. So that is the combinatorial approach. You just take the possible values at either extreme or combine them with other values of other variables.*

And then, each of that, represents a combination. And then you say 'What do we see happening in a world where it is cold climate, politically unstable and 2% investment in agriculture. What do we see happening in that world?' That's very similar to saying in the top down approach [2x2 matrix] *what will happen if I am in the top left. Only that now, if you do a scenario 2x2 approach, you only have four possibilities. With the combinatorial approach you have all possibilities. As a starting point. As a starting point, from which you then brainstorm events, what may happen and snippets. And then it can well be that in some of the starting point, of which you may have 20 or 30, that you actually say, 'this is internally not consistent, this cannot happen'. So, you eliminate a few. Other ones stay on the road. And those that stay on the road, you then start saying 'Which of these different starting points could actually happen together?'. Some of them are mutually exclusive, so they cannot happen together, because it would be incoherent. And that's where your clustering starts, in the bottom up approach. You eliminate a few possibilities because they are not possible for all kind of reasons, and you start aggregating together what belongs together and differentiating what is mutually exclusive. And you end up with two three four or five different embryos of scenarios let's say*". (Int #7)

Figure removed for copyright reasons.
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Figure 8: The Matrix of Multiples. Adapted from an unpublished presentation from the personal records of interviewee #1.

It is important to note that the combinatorial technique, by its very nature, does not produce whole and complete scenarios, but only a most helpful scaffold that is used

for the further development of the scenarios. What is typically produced are incomplete descriptions of alternative future end states, with fragments of an explanation of why and how a future might come about. A lot of additional work is needed to produce a complete scenario set, such as a more complete description of the end states, fully developing the scenario logic, developing the scenario stories, identifying and/or finalizing the critical uncertainties, establishing the focal questions and the branching points and checking the plausibility, relevance and novelty of the scenarios among others. As in almost cases where the scenario team produces material in a workshop setting, the scenario planning experts have to collect whatever material the scenario team produced during the workshop and further develop it into a coherent whole, primarily offline. Finally, the GBN 2x2 matrix process can be considered as a special case of the combinatorial approach.

4.4.5 The organizing principle

The third technique that the researcher identifies in the data is based on the concept of the *organizing principle.* Participants of this research described the organizing principle as '*the scenario theme*', '*the central message the scenarios intend to communicate*', '*what the scenarios are about*', '*the essence of the scenario*', '*a fundamental principle*' and '*much more than a description or a summary of the story - it is like a model, a business model, or an exemplar or a case study or a metaphor or it is a very rich dynamic living complicated system*'. The idea of the organizing principle was evident in many cases of scenario planning experts, and in both Shell and GBN reports. One example of this is the *Shell Guide to Planning No. 1* report, where the key elements in the development of scenarios are presented (Shell, 1984). The development of scenarios is summarized in just two sentences which are provided below. Figure 6 is adapted from the same Shell report and depicts a model of the scenario development process, showing the role of the organizing principle.

> *'Once these* [research and analysis] *studies are in hand, an attempt is made to delineate internally consistent scenarios around organizing concepts (e.g. restructured growth). These concepts are intended to communicate central messages (e.g. growth involves change)'* (Shell, 1984, p. 10)

Figure 9: '*Development and Use of Scenarios*'. Adapted from a Shell unpublished internal report (1984, p. 10).

The organizing principle also appears in the GBN Workbook (2009) under the name *high concept*. The high concept is described as: "*One sentence description of a story idea. Instantly grabs attention and hooks the intended audience*" (slide 92). Following the development of the scenario matrix, the GBN workbook recommends that scenario planners search for a high concept in each quadrant.

According to the data, and as the name suggests, the primary function of the organizing principle is to provide an anchoring point for organizing the information in a scenario. Ideally, every piece of information in a scenario should be organized around the organizing principle and form a coherent whole. In addition to that, this research indicates that scenario planning experts may use the organizing principle in order to develop scenarios. The process essentially involves cycles of searching for an organizing principle, developing a story around the organizing principle and updating the organizing principle as knowledge and understanding accumulates.

In one case of a scenario planning project that was examined, the scenario team was given the task of developing a scenario in which a new zero carbon energy system emerges and describe how the end state might look like, how and why this might happen

and what other implications this might have. The interviewee described the organizing theme as a *scaffold* that was used to decide which driving forces to use in this scenario, to brainstorm events and what else may happen and to provide the evidence to support the scenario. The below abstract also serves as evidence of how the organizing principle is used by scenario planning experts.

'*And so, in leading projects, both in GBN and in my own, that's always the toughest part* [developing the actual scenarios]. *So, in that context then, the challenge of navigating through that creative process is finding something to hold on to, to give you confidence that you can have good scenarios that they are relevant. And I think this is sort of what the high concept I would say is trying to do. It is like the structure of the storyline; you can draw the analogy of a writer as he is developing the story. You have this idea and then you create the story around it*'. (Int #8).

Finally, some interviewees argued that there is high value in clearly declaring and presenting the organizing principle of each of the scenarios developed. Ideally, the organizing principle should communicate the essence of the scenario in a way that easy to understand and remember. For example, in the case of the Shell 1986 Oil Scenarios, one the focal questions was '*Can energy markets recover?'.* The organized principle for the *Managed Market* scenario was '*it can be done, but the player who is holding up the whole pyramid* [OPEC] *needs great skill and determination'.* The organizing principle was illustrated with an image of acrobatics (Shell, 1986b).

4.4.6 The structure of the scenario set

An interesting and important observation that was made during this research is that the scenarios that constitute a scenario set were most typically accompanied by and presented to the audience through the use of one or more *focal questions, branching points,* and a structure that arranges the scenarios in a particular order. In most of the cases examined, the scenario report or presentation included a figure that communicated all these items. One representative example is the figure found in the 'Long-Term Scenarios – Energy' report, showing the focal questions, branching points and relationships between the scenario stories for the Oil Scenarios project (Shell, 1987). Figure 7 is an adaptation of the original figure.

Figure 10: The focal questions and the branching points of the 1986 Oil Scenarios. Adapted from a Shell unpublished internal report (Shell, 1987, page 1).

In the above picture, the focal questions are '*Will energy markets recover?*' and '*Can international oil markets be effectively managed?*' and are used to indicate two branching points, with each branching point splitting the future in two directions, based on the answer to each focal question. The second branching point is nested in the 'yes' branch of the first branching point thus resulting in three different future pathways described in the three scenario stories 'Managed Market', 'Roller Coaster' and 'No Recovery'.

Scenario planning experts referred to the set of focal questions, branching points, dimensions across which the scenarios are different and the order of the scenario stories collectively using the term the *structure of the scenario set*. The structure of the scenario set indicates the questions that the scenarios will answer (the scenario focus), how the scenarios are different (across which dimensions), and how the scenarios relate to each other (e.g. nests, 2x2 matrix). The focal questions, as also covered in section 4.2 and as the name suggests, capture the focus of the scenario project and help organize raw information into scenarios. They provide direction for the development of scenarios by indicating what is relevant and should be included in the project and what is not relevant and should not be left out. The structure of the scenario effectively provides a framework for considering the future by indicating specific angles, lenses or slices from which the future can be examined.

The structure of the scenario set and critical uncertainties

A most important finding of this research is that the focal questions and the structure of the scenario set are intricately linked with the concept of *critical uncertainty*. All scenario planning experts that participated in this research strongly insisted that the focal questions and structure of the scenario set should be developed based on and reflect what the most critical uncertainties are considered to be. In the words of two highly experienced interviewees:

> '*Focal questions highlight the most critical uncertainties or the most important unknowable elements in the problem.*' (Int #3).

> '*The branching points were an issue almost from the very start of the process. Because by discussing branching points, one is addressing the most basic question of all: Which are our most profound and far-reaching uncertainties? Which questions would we most of all like to answer? What do we think is, in the long term, at stake for our business, and which structural changes will impose the largest transformations on our industry? These questions have, already in the interviews, always played a role in the background, because the scenarios do not have to be correct or true, but they have to be relevant. The branching points showed immediately what the scenarios considered the decisive issues for the oil and energy industry.*' (Int #5)

The rationale that the participants provided goes back to the very definition of the concept of critical uncertainty. Critical uncertainties express these issues that are fundamentally important for the clients, unknowable and beyond their control. If scenarios are to be useful and effective, they need to answer the most important and unknowable questions of the clients. With a similar logic, branching points need to be selected in a way that the resulting future environments are vastly different between each other, with each future environment having significant implications for the client group. In the case of the Shell 1986 scenarios, these questions were '*Will energy markets recover?*' and '*Can international oil markets be effectively managed?*', and each scenario described large transformations of the oil and energy industry (Shell, 1986b).

As a final note, critical uncertainties are used to determine the scenario focus and how the scenarios are different. Scenario planning experts seek to gain a first sense of what the scenario clients perceive as critical uncertainties during the very first stages of the project, i.e. in the introductory talks with the clients and during the interviewing process. This would most probably lead to a tentative, first formulation of the focal questions. In a few cases that were examined, the critical uncertainties and focal questions were determined in the very beginning of the project and remained the same throughout the project. In most cases, critical uncertainties and focal questions evolved throughout the scenario project, and in some cases were finalized only after the development of scenarios. It is typically expected that as the scenario team better understands the situation, the critical uncertainties, focal questions and the structure of the scenario set will evolve.

4.4.7 The inductive and the deductive approach

Most importantly, all participants of this research distinguished between what they called the *inductive approach* and the *deductive approach*, referring to the way and sequence that the critical uncertainties, the structure of the scenario set, and the scenarios are identified and developed. These terms were common among all the interviewees, with the exception of one scenario planning expert who preferred to use the terms bottom up and top down approach respectively. Interviewees used the term deductive approach to refer to cases where a set of critical uncertainties and how the scenarios are different is determined first, and using this framework, the scenario team attempts to develop the scenario stories. On the other hand, the term inductive approach was used to refer to cases where the scenario stories are developed first, and the structure of the scenario set is established afterwards based on the scenario stories. The below abstract serves as an example.

'Your framework is a 2x2 matrix. That's a structure. That's the structure of your scenario set. Your framework. You chose your framework first in the deductive, using two parameters. And then you develop the stories of what that future means, looks like and how it came about, by putting all the other factors back into each of those boxes. That's your deductive method. In the inductive method, you start the other way, you got all the different pieces of factors and you basically tell stories about them and then look for

certain patterns around the types of stories that are being told. So, you collate stories and group them, and then decide what does that mean about the structure of the scenario set. So, in the inductive method, the stories come first, and the structural framework comes after. You have tried the deductive method, which is to get the framework first and the stories after.' (Int #6).

It is most important to note that almost all participants of this study used the term deductive method to refer to the GBN 2x2 matrix-based method and these two were treated as the same. However, one participant argued that the GBN method is only one of the many possible methods that can be used to develop scenario sets deductively or top down. This point is illustrated in the brief interviewee statement that can be found below.

'*The 2x2 matrix is one manifestation of the top down approach. But is not the only one. So, under the top down approaches, the 2x2 matrix is the most used example and the simplest one.*' (Int #7).

While many interviewees used the terms deductive approach, deductive method and GBN method interchangeably, the researcher suggests using the term deductive approach to refer to the larger set of methods and approaches where the critical uncertainties and the structure of the scenario set are determined before the development of the scenario stories.

Finally, the vast majority of the participants of this research exhibited a very strong preference for either the inductive or the deductive approach. Those scenario planning experts that were more closely associated with Shell insisted that they only use the inductive approach. They further described the GBN 2x2 matrix-based method as a quick and dirty approach and argued that it leads to sub-optimal results. Participants that were only associated with GBN had a strong preference for the GBN 2x2 matrix-based method. Two participants of this research had equal exposure to Shell and GBN. The first participant argued that each approach has its own merits and deficiencies and the appropriateness of each depends on the context of the scenario planning project. The second participant argued that the GBN 2x2 matrix method and the inductive approach produce very similar results.

4.4.8 Conclusions

The fourth theme that the researcher identified in the data is *developing scenario sets.* The central question that scenario planning seeks to answer is '*what may happen in the future and why?*'. This study indicates that a scenario is not a mere description of future conditions, but scenario planning experts actively develop an explanation of why and how a specific future may come about. This constitutes the scenario logic. The researcher also identified in the data and delineated three aspects of the analytical process of developing scenarios and, based on that, developed and suggested three techniques, namely developing sequences of causally linked events (the snippets technique), creating internally consistent combinations of end states for each focal issue (the combinatorial technique) and organizing information around an organizing principle. These three are not mutually exclusive as they refer to different aspects of developing scenarios and can be thought as different lenses of looking at scenarios and what a scenario is. Another most important finding of this research is that scenarios sets are not mere collections of scenarios. Scenario planning experts develop the structure of the scenario set that indicates the questions that the scenarios attempt to answer, how the scenarios are different among themselves and arranges the scenarios in a specific order. Finally, the researcher also clearly defined the inductive and deductive approaches to developing scenarios. Table 13 provides an overview of the theme and shows which cases support the findings presented in this section. Table 14 and Figure 11 serve as additional evidence that demonstrate the prevalence of the theme in the data.

Theme and subthemes	Supporting cases
Developing scenario sets	All participants
o Developing the scenario logic	All participants
o Developing the structure of the scenario set	All participants
o Developing sequences of causally linked events	Par. #3, #4, #7
o Developing combinations of future end states	All participants
o Structuring the scenarios (the inductive and the deductive approach)	All participants
o Organizing information	Par. #1, #5, #7, #8

Table 13: The theme developing scenario sets, along with the cases that support the findings.

Int #2	*So, this research is more than just looking for neutral facts. This is looking for explanations that justify why certain kinds of futures should lie on the table... Because to be open to any new fresh future you have not thought about, you need to have some explanation, not just there is this future, it could possibly happen.* […] *So, I think, some of this research, these people carry alternative stories, and these alternative stories are explanations which justify alternative futures. They have to be good, strong, cogent explanations, because otherwise, why should I stop believing the existing theory? This is business as usual. Why should I take it seriously? Because this is a good explanation. Ok, alright. I am going to take it seriously. Because you are building something up. So, it is sort of embodied research, it is already in the form of story tellers.*
Int #3	*The argument is following: in any scenario, what matters more than anything else are the fundamental bedrock assumptions you are making about the world. And where one scenario is different from another is because of some critical areas you are saying 'imagine if this assumption were different from this one'. And if you go back for example to Peter Swartz, in his book in the middle 80s he talks frequently about business as usual and then he talks about alternate scenarios. And the difference between one and the other, is around one fundamental or two fundamental assumptions but then lead you off to quite different areas. The scenarios cannot be credible, unless you can find evidence in the present and historical interpretations that allow those assumptions to have currency, to be legitimate, there are measures what is legitimate and what isn't. As soon as you change the assumptions about the present, then, it depends on what sort of model you are working, it is where the model, it is not just the assumptions, it is also the way you interpret the consequences over time that matters. So, you can have small differences here, and lead to quite different views on where you can be in the future.*

Table 14: Additional evidence demonstrating the prevalence of the theme *developing scenario sets* in the data.

Figure 11: Figure demonstrating the search for the scenario logic as part of the GBN methodology. Figure as found in GBN report *Developing & Using Scenarios: Guide and Workbook* (2009, p. 104).

4.5 Challenging the assumptions and beliefs of the clients

4.5.1 Introduction

The fifth theme that the researcher develops is *challenging the assumptions and beliefs of the clients*. This practice was strongly evident in all interviews with scenario planning experts as well as in several internal reports from GBN and Shell. All participants of this research frequently made statements similar in meaning to '*scenarios need to be challenging*' and '*it has to challenge the existing mental models of the decision makers*'. In addition to that, all participants emphasized the importance of challenging the mental models of the decision makers, highlighting that this consists a core objective of every scenario planning project, if not the sole purpose of a scenario planning project from the perspective of the scenario planning expert.

The rest of the section is organized as follows. In sub-section 4.5.2 the researcher presents the data related to the importance that participants assigned to challenging the assumptions of the clients. Following that, the focus of sub-section 4.5.3 is the subject of challenge (i.e. the assumptions and beliefs of the clients) as well as the reason why scenario planning experts seek to challenge the assumptions and beliefs of the clients. In sub-section 4.5.4 the researcher delineates what it means to challenge the assumptions and beliefs of the clients and how this is achieved. The resistance that the clients exhibit when their assumptions and beliefs are challenged is covered in section 4.5.5. Finally, the summary and conclusions of this section can be found in sub-section 4.5.6.

4.5.2 The long-lasting importance of challenging the assumptions and beliefs of the clients

An important finding of this research is that challenging the assumptions and beliefs of the clients has been historically considered a crucial and defining aspect of scenario planning and retains the same importance in modern day scenario planning practice. This research traces this practice to as early as the mid-80s, with the first written evidence found in Shell internal reports from that era. One example of such a report is the *Shell Guide to Planning Series No. 5: Focused scenarios* report (Shell, 1986a), that introduces the idea that scenarios should be challenging and describes it as the '*ideal*' and a '*commandment*'. The bellow small abstract is from the aforementioned report.

'*Scenarios should be challenging, but credible. To strike the balance between challenge and credibility is an art in which resides much of the skill of producing good scenarios. Anyone can produce scenarios which are credible, but boring, and almost anyone can produce views of the future which are challenging to existing orthodoxy but so outlandish as to be past belief.*' (Shell, 1986a, p. 11)

In the same report, the case of a '*recent scenario exercise*' is put forward. The project is described as '*not productive*' and having wasted '*a good deal of time and effort*' (p. 13). According to the report, breaking the commandment of developing challenging scenarios is one of the reasons for characterizing this project as unproductive and a waste of time and effort. In line with the Shell report, all participants of this research strongly emphasized that challenging the assumptions of the clients is a core objective of their practice. Further to that, most of the participants considered scenario planning projects where scenarios are not challenging as unsuccessful, problematic, pointless, or not worth the effort. Or, developing scenarios that are not challenging is simply something that scenario planning experts will not admit doing.

4.5.3 The subject of challenge and the rationale behind this practice

Participants of this research, as well as the authors of the reports examined, used a variety of terms such as *assumptions*, *beliefs*, *mental models*, *mental maps*, *cognitive map, microcosm, worldview, mindset, conventional wisdom* and *how someone thinks the world works* to refer to the subject of challenge. These terms were used interchangeably by the participants and almost as if they have identical meaning. While there are important differences between these terms, what these terms have in common is that they refer to various aspects, elements, or the totality of a person's cognition.

Throughout this research, participants referred to the idea that individuals mentally construct and rely upon internal representations of the external world to interact with the world around them. This idea was also evident in many internal reports examined by the researcher. Interviewees expressed this idea either by borrowing formal concepts and theories from the field of cognitive psychology (e.g. the concept of a mental model) or without mentioning a specific formal theory or concept. As an example of the

latter case, the below statement from the unpublished original version of Pierre Wack's papers, contains a short description of such an inner model of the external world, that he calls *the microcosm.*

> *"Central to decision-scenarios, where they succeed or fail, is the microcosm of the decision maker: his inner model of reality, his organized set of assumptions which structure his understanding of how and why his business environment is going to unfold and what are the critical factors which make and will make for success. This inner model never mirrors reality: it is always a construct: microcosms are basically superior 'simplifications', they deal with complexity by focusing on what really matters."* (Wack, 1984, p. 72).

In almost all cases, this idea of an inner model of the external world was considered to be central in scenario planning. One example of this is the Shell *Global Scenarios* report (1988), where the authors dedicate a significant section to explain the concept of the mental model. According to the authors *"developing and using scenarios is the central theme of this guide. However, the first section will deal with 'mental maps', as this is the underlying concept of the scenario methodology used."* (Shell, 1988, p. 2).

Based on the above, the researcher will use the terms *assumptions and beliefs* to refer to the subject of challenge. The reason for choosing the specific terms is that throughout this research and whenever participants referred to an actual, real life scenario planning project, the subject of challenge was a concrete assumption or belief of the clients and not an abstract concept (e.g. mental model, microcosm). For example, in a scenario planning project that was examined, one of the clients was arguing and insisting that investing in nuclear energy as the source of energy for a geographic region would lead to the creation of more jobs in the area, as compared to other forms of energy (e.g. renewables). The assumption that the scenario planning expert described to have challenged was the idea that investing in nuclear energy would lead to more jobs. In the case of nuclear energy, the assumption was explicitly stated by the client. In other cases, what is treated as true and certain is implicit or hidden and needs to be uncovered. For example, the success of strategies and policies depends upon several assumptions that are not immediately visible and need to be uncovered. Assumptions and beliefs can be

either about the past, the present, or the future. In the words of one interviewee, the subject of challenge is '*what people know and what they assume about the future'.*

The reason why scenario planning experts seek to challenge the assumptions and beliefs of the clients is explored here. The clients make assumptions either about the past and present or the future, and some of them are fundamentally important, because they might, for example, be used as the basis for making critical decisions and formulating strategies and policies. For example, in the above case of a scenario planning project where the clients were trying to decide which form of energy to invest in (e.g. nuclear energy, renewables, gas) one of the factors to determine which form of energy to invest in was the number of jobs created in the region. One of the clients was claiming that investing in nuclear energy would create more jobs than investing in other forms of energy. However, as one of the interviewees elegantly explained '*what they* [the clients] *think they know about the present, often what they know about the present is a load of cobblers, doesn't have any standing in fact*' and '*what they assume about the future is just wishful thinking*'. All participants of this research explained that the clients treat various assumptions as certainties and as facts, however, some of these fundamental assumptions turn out to be invalid or uncertain. In addition to that, the clients essentially have a narrow view of the future and their microcosm misses important elements that would allow them to understand and interpret the relevant situation. The interviewees described this situation as unsatisfactory and problematic; a core objective of a scenario planning project is to address it.

Challenging the assumptions and beliefs of the clients involves revealing and identifying the fundamental assumptions that the clients are making and then selecting those that according to the scenario planning experts are important. Revealing the assumptions of the clients can be achieved in many ways, most prominently through the interview and feedback process, by holding deep conversations with the clients and by looking for divergent views on issues among the clients and other relevant people. The researcher asked the interviewees to justify why they select specific assumptions and ignore others. Some of the interviewees replied that they use their own judgement to select specific assumptions that they consider fundamental and ignore others. For this and other reasons as well, half of the participants claimed that the scenario planning

experts must have deep subject knowledge of the issues that the scenario project focuses on, so he can prioritize some assumptions and ignore others.

According to some interviewees, even the very process of revealing to the clients their very own assumptions can have significant value. The reason for this is that the clients in many cases are not even aware of their own assumptions and the assumptions of other people. Identifying an assumption provides the opportunity to further analyse its validity and also pinpoint the source of divergent opinions across the client group.

4.5.4 What constitutes challenging?

The researcher asked the participants of this research to clarify and elaborate on what they mean with the term *challenging* when using expressions such as '*scenarios should be challenging*' and '*challenge the existing mental models*'. A most important finding of this research is that <u>all</u> participants described the term challenging in a similar way and assigned to it a specific meaning compared to its everyday layman's sense.

In detail, participants of this research described and defined scenarios that are challenging as scenarios that contain <u>novel information</u> that is <u>inconsistent</u> with the clients' assumptions and beliefs. In a similar way, interviewees described challenging the assumptions and beliefs of the client as asking the clients to consider and accept novel information that is <u>inconsistent</u> with the original clients' assumptions and beliefs. To demonstrate how the above statements emerged from the data, two abstracts from interviews with scenario planning experts are provided below:

'*In some ways, I think for a lot of people challenging means difficult or tricky situations. I actually think that the better definition of challenging is challenging to our own assumptions and worldview. And that doesn't often mean that objectively it is the most challenging scenario, the most difficult one. It just means that we have a set of assumptions about what we think is going on in the world and there are certain scenarios that just seem completely counter-intuitive* [strong emphasis in voice] *to us*. […] *a scenario that is challenging simply because it goes against all of our pre-set assumptions about how we think the world works*' (Int #9)

Interviewee #4: '*Now, when you talk about challenging scenarios, it has to challenge the existing mental models of the decision makers...*'

Researcher: '*You said challenge their mental models. What does challenging mean?*'

Interviewee #4: "*New information! New information which creates dissonance inside the person's head. The first response will be 'Nah, that's impossible'. Then you show them the research, that's why you have to have research, and then perhaps they say 'OK, that is possible'... The way the word challenging can be used which is not 100% the right way, is 'I challenge you'. Whereas the best challenge is I put information in front of you, which you take in and say, 'This doesn't fit with what I believe'*."

As can be seen in the above abstracts, participants of this research made an important clarification about what constitutes a scenario that is challenging and what not. While a scenario can be demanding and testing the clients' abilities in many different ways, participants of this research insisted that when they seek to develop scenarios that are challenging, they first and foremost seek to develop and present to the client a scenario that is inconsistent with the clients' assumptions and beliefs.

Based on the data, the practice of challenging the assumptions and beliefs of the clients can be delineated in three fundamental aspects: *introducing novel information*, *disconfirming certainty,* and *stretching mindsets*. The purposeful introduction of novel information is how scenario planning experts disconfirm certainty and stretch the clients' mindsets.

Introducing novelty

As also stated earlier, challenging the assumptions of the clients involves introducing novel information. Participants of this research considered this as a defining aspect of the practice. The below short passage from an interview serves as an example.

'[Introducing novel information] *is one of the components of how you challenge people. Novelty is put in a list of things that make a good scenario set, but it is there because you*

want people to re-perceive the way the world works and what you might have to accept. So, and something can be novel in one context and old news in another. Anybody who has crossed boundaries knows that.' (Int #1)

The above abstract also serves as a representative example of another important point that was frequently made by most of the interviewees: what is considered as novel is in fact related to the audience. In other words, the same idea might be considered novel for one group of people and old news for another group of people. Many interviewees frequently claimed that one of the best ways to introduce novel ideas into the scenario process is to identify these ideas from outside the client group and bring them into the scenario process. An outsider who is introduced in the scenario planning project with the purpose of challenging the assumptions and beliefs of the clients and is the carrier of such novel information was often referred to as a remarkable person. The above abstract also illustrates the connection between what sometimes appears in the literature as one of the criteria of high-quality scenarios and the practice of challenging the assumptions and beliefs of the clients, i.e. the need for scenarios to be perceived as novel.

Evident in the data is the distinction that interviewees made between two types of novel information:

1. What the interviewees described as research. This typically includes facts, analyses, theories, concepts, alternative perspectives, and ways to understand the situation, or in general anything that can help the clients better understand the situation and how the relevant part of the world works. The researcher recognizes that conducting research can fulfil many functions in a scenario planning process. However, when discussing the subject of challenging the assumptions of the clients, the scenario planning experts explained that the intention is to use this information to advance the clients' understanding of the relevant situation, to imagine and develop scenarios of plausible futures and support the plausibility of these futures.

2. Scenarios of plausible futures. In the context of challenging the assumptions and beliefs of the clients, the intention is that the scenarios will '*widen the set of assumptions in the mind of decision makers about how the future might unfold*'.

Stretching mindsets

As briefly stated above, the most important reason for introducing novel information is to advance the clients' understanding of how the relevant part of the world works and to widen the clients' perspective of what futures are plausible. Further to the above, participants of this research, described and defined novel information as information that '*contains an element of surprise*' or '*seems completely counter-intuitive*' or is '*beyond expectation*' or constitutes '*a brand-new way to examine the situation*' in relation to the clients, or will transform their thinking, often referred to as re-perceiving. It is expected that this novel and surprising information will stimulate the clients' minds and will make them consider possibilities and assumptions that are legitimate, but the clients have not considered before and were beyond their mental reach. For these reasons, challenging the assumptions and beliefs of the clients was considered by many interviewees as a process of stretching the clients' thinking. A few interviewees explicitly stated that stretching the clients' thinking and assumptions, re-perceiving and challenging the assumptions and beliefs of the clients as *'the same thing*'.

Disconfirming certainty

Disconfirming certainty is related to the existing assumptions and beliefs of the clients. According to the data, the intention of the scenario planning experts is to disconfirm the validity of the assumptions and beliefs of the clients that they implicitly or explicitly treat as certain. This entails either completely invalidating an assumption and claiming that is not valid or arguing that an assumption is uncertain, e.g. there exist other assumptions and perspectives that may also be considered valid but lead to inconsistencies with the original assumption. As one interviewee stated, '*you hear what people are saying and then you go check whether it is true or not*'. Participants of this research strongly insisted that it is very difficult or even impossible to disconfirm the current assumptions and beliefs of the clients without introducing novel information since '*people don't let go of their beliefs and logic systems very easily*' (Int #6).

4.5.5 Resistance to challenge and the narrow band of tolerance

According to the interviewees, presenting novel and challenging information to the clients does not mean that the clients will immediately accept the new information and make it part of their understanding. Many participants of this research stated that the

first reaction of the clients is – or, should be - to reject the novel information, with the clients most typically arguing that the novel information is wrong or refusing to consider it in general. On several occasions, some participants went even further, effectively suggesting that they have not actually challenged the assumptions and beliefs of the clients unless the clients exhibit such signs of resistance.

> "[Challenging the assumptions] *is a tough thing to do because you are going right to the heart of the assumptions and biases and hopes that decision makers have, and trying to play a scenario out, the chances are that a lot of people are going to say either 'I do not believe that scenario' or 'I do not even want to think about that scenario'. That's the reaction you might often get. And If you do get that reaction, the chances are you've actually got a really interesting scenario, the question is, can you sell it into the organization?*" (Int #9).

An important idea that many participants expressed and was also found in some of the internal reports examined, is that scenarios (and novel information in general) can be more challenging or less challenging. Scenarios that were considered as more challenging were regarded as of higher value because they are more informative and stimulate the clients' thinking. On the other hand, scenarios that were considered as less challenging were regarded as of lower value because they stay close to and repeat what the clients already know. However, according to the participants, there is an inverse relationship between the level of challenge and the likelihood that the clients will accept the scenarios. Specifically, as the level of challenge increases, the likelihood that a scenario will be accepted decreases. This inverse relationship is also evident in the below short abstract from a Shell report.

> '*Anyone can produce scenarios which are credible, but boring, and almost anyone can produce views of the future which are challenging to existing orthodoxy but so outlandish as to be past belief.*' (Shell, 1986a, p.11)

Because of this inverse relationship between the level of challenge and the likelihood that the novel information is accepted, many participants frequently argued that there is a '*sweet spot*' or a '*narrow band*' within which the scenario process is most

effective. Some interviewees claimed that the best practice is to develop scenarios that are as challenging as the scenario clients can tolerate. Other interviewees claimed that this sweet spot or narrow band is actually a very thin line. Identifying and shaping the boundaries of this line or the area of maximum effectiveness was considered by many scenario planning experts as part of the art of scenario planning (in contrast to the science of scenario planning). To support the above claims, an abstract from an interview with a scenario planning expert can be found below.

"*There is a narrow band. Go below it and they get bored, go above and they kill you. They get bored and they say, 'But we already knew that, what are you telling me that's new?'. You are not doing anything that actually puts things in a new light. You are just repeating accepted wisdom.*" (Int #1)

According to the data there are three reasons why the clients of the scenario planning project might reject the novel information. Firstly, because the novel information is quite different from what the clients already know and believe. In other cases, the novel information might hurt the self-esteem of the clients and/or creates an emotional challenge. Finally, clients might exhibit such signs of resistance to challenge because the novel information goes against their self-interests.

"*I think there are two challenges, one is the intellectual challenge which is 'what you are saying is upsetting my assumptions or is forcing me to consider information I haven't considered before'. But due to that intellectual challenge, you have this emotional reaction. Which is 'you are telling me I am wrong, you are telling me I do not understand the world, that everything I have been doing is been misplaced'. So, you are hurt, your self-esteem is hurt by having your assumptions about the world challenged. So, there is an emotional challenge and an intellectual challenge.*" (Int #1)

Scenario planning experts explained that they engage in several activities and adopt strategies that increase the likelihood that the novel information is accepted by the clients. One major such strategy is to guide the clients to discover the novel information and reach the conclusions on their own, instead of the scenario planning experts providing the information to the clients directly. Another strategy that was mentioned

frequently is to invite an outsider, an individual who has no vested interest in the outcomes of the scenario planning project and is perceived as credible to introduce the novel information. The term that participants of this study used to refer to such individuals is *remarkable people*, a topic that was explored in detail in section 4.3.3. According to the data, the source of novel information and its perceived credibility plays an important role in whether the novel information will be accepted and internalized or not. More generally, novel information and especially scenarios must be perceived as *credible,* otherwise they will be rejected. However, the data indicate that there is a strong element of subjectivity towards what the clients would consider credible and what not.

4.5.6 Conclusions

In conclusion, this research indicates that scenario planning experts seek to challenge the assumptions and beliefs of the clients. Based on the data, the researcher identifies three fundamental aspects of the practice: introducing novel information, stretching mindsets, and disconfirming certainty. Stretching mindsets and disconfirming certainty is achieved by purposefully introducing novel information. The subject of challenge is the fundamental assumptions and beliefs that the clients are making about the past, present, and future. According to the interviewees, a typical reaction of the clients when their assumptions and beliefs are challenged is to resist the novel information. For that reason, there exists a sweet spot or narrow band, above which the novel information is rejected by the clients and below which the assumptions and beliefs of the clients are not sufficiently challenged. Challenging the assumptions and beliefs of the clients was described as a core objective of every scenario planning project, if not the ultimate purpose of scenario planning, from the perspective of the scenario planning expert. Table 15 provides an overview of the theme and shows which cases support the findings presented in this section. Table 16 serves as additional evidence that demonstrate the prevalence of the theme in the data.

Theme and subthemes	Supporting cases
Challenging the assumptions and beliefs of the clients	All participants
o Introducing novelty	All participants
o Stretching mindsets	All participants
o Disconfirming certainty	All participants

Table 15: The theme challenging the assumptions and beliefs of the clients, along with the cases that support the findings.

Int #2	*So, what we were doing in our workshops is we would certainly listen to them, interview them, we would do some research and then we would get people who were responsible for these explanations. It is not always about the environment. So, in the electricity generation business, they were people who critiqued the structure of the electricity business and they have written books. So, you could ask these people to come in the room, come to the workshop and at the beginning, they would present for half an hour. And then, there would be a debate. And they might even go away very often. They might not even stay. But they would come, they would give their explanation, and the people would listen, and then you discuss it. And then you go away and then we would talk about 'what do you think?'. Because we, the scenario planners could position ourselves as less extreme than the speaker. So, if there is a kind of business-as-usual bubble, then we would try to expand the view of the client. So, we would get somebody crazy out here – not crazy because the crazy people fool around- but a critic of the industry whose position is out there to come in. So, we stretched their minds, but then we, the scenarios planners have interviewed them, so we are operating here. So, we would say, 'What do you think, do you think they are crazy?' I am here, on the boundary of what you find acceptable.*
Int #3	*I think firstly good framing is about understanding the assumptions behind the broader area. Secondly, which is maybe easier, what is business as usual and what is it based on? Again, what are the assumptions behind business as usual? Then next thing is to – this is complicated - is to bring people who represent the types of change you are going to have to face. The new technologies, social change, social media, maybe its politics and so on. This is where a judgment is called. You can't have the whole world coming in. You can bring in five to ten*

	really very insightful people. We brought in when we did this work […] *So, they are in the very first workshop to help people to fundamentally reframe.* […] *It's this sort of pushing against conventional wisdom.*
Int #5	*The* [name] *scenario challenged 'traditional wisdom' in the oil industry, because many managers had grown up with the idea that the OPEC cartel was in control, and would remain in control;* […] *Outside the oil industry, many experts and gurus did not at all see the Seven Sisters in a central position in the world of oil. They had very different perspectives of the oil and energy scene.* […] *Quite a few of these experts were not popular in the industry, as they tended to be critical. But in the* [name] *scenario, we took their points of view seriously, and built on the assumption that these outsider experts would prove to be right.*
Int #6	*People don't let go of their belief and logic systems very easily. So, you have to get them to, to break their own logics. It is like a mental shattering. In expert logics, you stand up and it is your idea versus somebody else and one of you wins. It doesn't work like that in scenario planning. If you facilitate the process and you got a group of executives who firmly think they are doing the right thing, you have to get them to work through a process. It is like therapy. A therapy of revealing themselves their assumptions and not ridiculing them, and then getting them to replace those assumptions with other assumptions.*
Int #7	*Scenarios by definition have to be uncomfortable. If they do not bring people out of the comfort zone, they are not doing their work. Because then you are not re-perceiving. So, the fact that people became uncomfortable and didn't like the conclusions is a fact that the scenarios were actually good, were challenging them and of course then as an organization you can do two things.*
Int #8	*The point is if there are situations where there are changes in the real world that you can't necessarily see because you are stuck in your own mental models. But if there are going to be dramatic ones, this is where scenario planning can help you see that world in a different way, that is the reframing [emphasis]. It is not just the broadening but my assumptions about how the industry works are turning upside down. My own ways of thinking and working are not working anymore. So, a reframing is a discontinuity in the minds of the managers, it corresponds to the discontinuity in the real world. A misalignment.*

Report	*Mental Map (or mental model): a set of assumptions that in aggregate becomes a framework for how a person or group interacts with the world and their business environment. Mental maps are usually implicit, i.e. often unstated.* *Official Future: the explicit articulation of a set of commonly held beliefs about the future environment that a group, organization, or industry implicitly expects to unfold. Once articulated, the official future captures an organization's shared assumptions—or mental map.* (GBN, 2008; p. 11).

Table 16: Additional evidence demonstrating the prevalence of the theme *challenging the assumptions and beliefs of the clients* in the data.

4.6 Catalysing conversation and dialogue

4.6.1 Introduction

The final theme that the researcher develops and suggests is *catalysing conversation and dialogue*. This research indicates that scenario planning experts carefully select individuals and bring them together in a process of conversation and dialogue to collectively explore the future. A scenario planning project most typically involves several facilitated workshops within which scenario planning experts seek to stimulate interactions, conversation and dialogue through various activities among carefully selected participants. These interactions between the participants are carefully managed so that the exploration of the future as well as other related objectives are achieved (e.g. developing a mutual understanding among the participants, identifying common issues). It is not necessarily the case that if these individuals were brought together in a room and engaged in naturally occurring, free conversation on their own the desired outcomes would be achieved or that the results would be of the necessary quality. The researcher used the term *catalysing* to indicate that scenario planning experts purposefully cause and assist these interactions among the relevant individuals.

The theme is evident in the data primarily in two forms. A first group of data relates to participants statements regarding conversation, strategic conversation and dialogue. All participants of this research considered these three as fundamentally important, making statements such as: '*So, in the end, scenario planning is indeed more about the conversation between people and stakeholders than about systems modelling*' (Int #7), or *'dialogue is always one of the purposes of a project*' (Int #1) or repeating a statement that is attributed to Arie de Geus '*The reliability of* [the scenarios] *is less important than the types of conversations and decisions they spark*'. The second group of data relates to the facilitated workshops that most typically take place as part of a scenario planning project. In all cases participants of this research described modern day scenario planning as a facilitated workshop-based process and any deviation from this was either considered as a shortcut due to resource restrictions or as a different kind of process. It is important to note that the researcher also checked for negative cases. The facilitated conversation process, while considered as the standard way of developing scenarios in modern day, is not the only alternative and it is actually an option.

The rest of the section is structured as follows. Firstly, in sub-section 4.6.2, the researcher presents the findings in relation to the facilitated workshops and the activities that catalyse conversation and dialogue. Following that, section 4.6.3 focuses on the objectives that scenario planning experts seek to achieve by provoking conversation and dialogue. The researcher explains the difference between conversation and dialogue in section 4.6.4 as well as why he used both terms in the name of the theme. An alternative approach to developing scenarios is briefly presented in section 4.6.5, along with the associated implications. Finally, the conclusion of this section can be found in section 4.6.6.

4.6.2 Activities that generate conversation and dialogue

An important finding of this research is that a scenario planning project normally involves a series of workshops, which participants of this research described from an analytical perspective. A typical, full-scale scenario planning project would usually involve one workshop focused on the framing of the scenario planning project, one or more workshops focused on presenting, analysing and synthesizing the research conducted, one workshop focused on developing the scenarios and one workshop focused on confirming the scenarios. While all these tasks take place in a scenario planning project, the number of workshops might vary depending on the scenario planning project.

Scenario planning experts carefully select (in agreement with the clients) the individuals that will get involved in the process. The scenario development team is the group of people who develops the scenarios under the guidance and assistance of the scenario planning experts. Individuals are selected for specific reasons, depending of the situation and the purpose of the scenario planning project. For example, in a decision-making project, the team primarily consists of the decision makers who will use the scenarios to make decision. In multi-stakeholder projects, the scenario team primarily includes the various stakeholders that are affected by the issues that the project is focusing on. Interviewees also mentioned choosing the participants of the workshop because of the knowledge they have over a specific subject or because they have the power to influence the situation that the scenario planning project seeks to address.

The scenario planning experts and the scenario development team fulfil different roles in a scenario planning project. According to the data, the scenario planning experts design and implement the scenario development process and also facilitate the workshops. The members of the scenario team work together during the workshops and carry out analytical work in relation to the development of the scenarios. All participants of this research described and provided evidence of engaging in several activities that stimulate interactions, conversation, and dialogue among the participants of the workshops. Most importantly, scenario planning experts assign to the participants various tasks in relation to examining the future and ask them to work together to accomplish these tasks (e.g. identify driving forces and critical uncertainties, work out how an issue might play out in the future).

For example, in one project that was examined, the participants of the workshop were given four different presentations concerning research conducted on issues such as energy, resilience, jobs and policy. The participants were asked to listen for critical assumptions about the future, possible surprises and trend breaks. The scenario planning expert had divided the participants into groups and asked the members of each group to discuss and decide on one critical assumption and one possible surprise or trend break. Once each team had discussed and decided on what the critical assumption and possible surprise or trend break is, the scenario planning expert asked the participants to write each of these on a hexagon and post it on the wall. Following that, and in a similar manner, the participants of the workshops were asked to discuss and decide how to cluster the resulting assumptions and surprises. Each group had to explain why they came up with those clusters and all the groups had to discuss the clusters together and name them.

Such analytical tasks purposefully generate conversation and dialogue among the participants of the workshop and can be described as tools that help generate conversation and dialogue. One participant described these tasks as *conversational devices*. The subjects of conversation among the participants are such analytical tasks.

Scenario planning experts also engage in activities that generate conversation and dialogue in ways other than assigning analytical tasks to the participants. For example, the last stage in the interview and feedback process is to present the findings to the clients

of the project as well as to the other participants of the workshop. Interviewees explained that they ask the participants of the workshop whether the findings of the interview and feedback process accurately reflect the group's thinking and knowledge. This is used to trigger conversation and dialogue among the participants.

In addition to stimulating conversation and dialogue, this research indicates that scenario planning experts also manage and guide the interactions among the workshop participants, with the intention of achieving specific outcomes. Some of the activities that were frequently mentioned are:

- Establishing clear rules for the interaction among the participants during the workshop. All interviewees expressed that they request the participants of the workshop to suspend judging other participants' assumptions, refrain from seeking to invalidate them and respect them. Another rule that was very frequently mentioned is related to confidentiality about who said what (also known as the Chatham House rule).

- Intervening in various ways during the workshop. To provide an example, facilitators very often ask the participants questions and to elaborate their thinking. If, during the scenario development workshop, a participant suggests that an event is plausible, the facilitator might intervene and ask the participant why he/she considers the event as plausible. If a group of people dominate the discussion, the facilitator might intervene to allow other members of the team to express themselves. In case a group of participants make a statement that contradicts the research conducted, the scenario planning expert might intervene to ameliorate this.

- Carefully designing the workshop setting. For example, interviewees claimed that they break down large groups of participants into smaller groups of the size they think is appropriate and they carefully allocate the participants in the tables, based on the characteristics of each individual.

Most of the participants insisted that is very difficult or even impossible to develop scenarios and have the desired conversation and dialogue by simply sitting people

around a table and without any form of intervention and guidance from the scenario planning experts (or at least the results will not be worth the effort). This point is summarized in the first abstract below from one internal GBN report, written by Kees van der Heijden (n.d.). In addition to the above, interviewees on many occasions provided examples where they had to intervene to make sure that the desired results could be achieved. The second short passage is an example of how the participants of one workshop shifted from the objective of exploring the future to discussing about different policies.

'*But experience has shown that these desirable results do not necessarily emerge spontaneously from people sitting around a table wishing to engage in such a conversation. Useful results come from a suitable process, involving a facilitator familiar with the dynamics of social interaction in this area*.' (van der Heijden, n.d.)

"*This is another problem in* [case of scenario project]. *They kept expecting this to be a dialogue about policy. And it wasn't a dialogue about policy. And we would say: 'imagine this'. And before you knew, there was a prescription about what* [country] *should do. And then we said 'No, we are not interested in what we should do, but we are interested in what might happen'. And shifting from 'should do' to 'might happen' is quite difficult. And it took them a long time to get off of the 'should do' to 'might happen'. So that was the first struggle we had with these guys.*" (Int #1).

4.6.3 Objectives of conversation and dialogue

As covered in the previous sections, the primary objective for catalysing conversation and dialogue is to involve the relevant people in the development of scenarios and to enable the exploration of the future to become a collective process among these people. However, interviewees also referred to several other objectives that they seek to achieve with conversation and dialogue. In other words, scenario planning experts carefully design and implement the activities related to conversation and with the purpose of achieving these desired objectives. In detail, these objectives are:

1. Almost all participants connected conversation and dialogue with the emergence of <u>novel insights and deeper understanding</u> in relation to the topic and issues that the

scenario project is focusing on. According to the interviewees, conversation and dialogue enabled the emergence of novel insights that might not necessarily emerge otherwise.

2. All participants described conversation and dialogue as the space where the members of the scenario team develop shared language, understanding and knowledge, in relation to exploring the future (e.g. what the important issues are, what the critical uncertainties are, how the relevant part of the world works, how the future might evolve). It is important to note that this does not mean that all members of the scenario team will agree on everything.

3. Conversation and dialogue accommodate divergent perspectives and develop a mutual understanding among the members of the scenario team. The vast majority of the participants insisted that the people involved in the scenario planning project will have different views, ideas and opinions in relation to the issues and questions that the scenario project is exploring. In many cases, these differences can be so substantial that they might even lead to conflict. Many participants expressed that a most important objective is the development of mutual understanding, i.e. members of the scenario team understand each other's assumptions, beliefs, perspectives, motivations, and incentives. In addition to that, many of the participants explained that a fundamental objective of scenario planning is not to minimise the differences and achieve consensus and agreement. In contrast, the objective is to identify such differences, define them clearly, examine them and in case the different views and perspectives are legitimate, to incorporate them into the scenarios.

4. All participants explained that conversation and dialogue enable the scenario team to identify issues, challenges, problems that, at least some of the members of the scenario team collectively face. While all participants mentioned this objective when talking about scenario planning in general, some participants specifically emphasized the importance of this objective in the case of multi-stakeholder scenario planning projects. Multi-stakeholder scenario projects revolve around larger issues (sometimes described as *wicked problems*, Ritter & Webber, 1973). Defining and addressing such issues requires the participation of multiple actors (e.g. several

companies, policy makers, NGOs), who will most probably have quite different definitions of the situation and different objectives. In those cases, the identification of common issues and challenges serves as a basis for the identification of common objectives, which in turn serves as a basis for collaborative action.

5. Many participants stated that during the process of conversation and dialogue members of the scenario team develop a much better working relationship with each other, build trust and learn to respect the perspectives and viewpoints of other people.

A few participants of this research often referred to the development of shared understanding, mutual understanding, awareness of agreement and disagreement, identification of common issues and objectives as the *social benefits* of scenario planning. The researcher suggests that a more appropriate term to refer to these social elements might be the development of *intersubjectivity*.

Most importantly, many participants of this research directly connected achieving the social benefits of scenario planning with enhancing the potential for co-ordination and collaborative action among the relevant people. This is evident in the below abstract from an interview with a scenario planning expert, who directly links together conversation, shared understanding and coordination among members of a business organization. In addition to that, participants of this research explained that in many cases a core objective of a scenario planning project (if not the primary purpose) is to achieve these social benefits. This applies to both single organization and multi-stakeholder projects, and especially in cases were the scenario planning project seeks to address a *wicked problem*. In those cases, the core objectives of a scenario planning project are to formulate a shared definition of the problem situation by the relevant stakeholders, identify common issues and objectives and enhance the potential for collaborative action.

"*Why am I making scenarios in the first place? And you need to be clear on that. So, in the context of scenario planning, the purpose is to inform managers or strategic leaders to make better decisions and to allow them to prepare the organization better for tomorrow.*

If that is the purpose, I can as an individual manager do that in my own mind. So, I can think about the world, I can think about the company, in my mind I can see how they fit, or where is it that there might be a non-fit and I can immediately have a feedback that says: 'therefore I need to adapt in this way or that way'. In an organization, typically you don't have one manager, you have many different people who together need to do decision making in consensus. And so, what I can do in my mind in a few seconds, we can only do it by talking to each other. So, we need to have a conversation so that together we think and talk about the external world, so that together we think and talk about ourselves, so we get common language, and together we can think and talk about what should be the adaptation. So, for me, strategic conversation is the space where that happens." (Int #7)

4.6.4 Conversation compared to dialogue

The researcher made the conscious choice of using both the words conversation and dialogue in the name of this theme. The reason is the following. Most participants insisted on using one of the two words and corrected the researcher when he used the opposite word. One interview used both the terms conversation and dialogue but considered these two as different forms of communication that are appropriate in different situations. The term (strategic) conversation was mainly used in conjunction with producing novel insights and developing a shared understanding among the participants. Most often, but not always, the word dialogue was used when there was conflict among the members of the scenario team, and they held significantly different views and perspectives. However, according to the interviewees, there is always disagreement and conflict (to various degrees) among the members of the scenario team and similarly, the development of novel insights and a shared understanding are always objectives of a scenario planning project. The researcher argues that the use of different terms reflects different intellectual traditions and a different focus in the situation and objectives, rather than there being two fundamentally different forms of communication that can take place in scenario planning.

4.6.5 The facilitated conversation as an option

All participants of this research considered this facilitated conversation process that was described above as the standard and typical way of developing scenarios in modern

times. However, this research indicates that this is not the only way that scenarios can be developed, nor does it describe how scenarios were developed historically. Interviewees often compared the facilitated workshop-based process with the possibility of developing scenarios offline and presenting them directly to the clients and other recipients of the scenarios. Under this approach, the scenarios are developed by the scenario planning experts, other analysts, and subject matter experts, but the recipients of the scenarios, the critical group of people who the scenario project aims to help and influence, are not part of the process of developing scenarios. Discussion and dialogue take place, but not among the same people as compared to the facilitated workshop approach. The process of scenario development itself is much less formalized and structured. The scenario planning expert is more of an analyst and expert in the related subject area and less of a facilitator and expert in design and implementation of participatory processes. Some of the participants explained that this how scenario planning was practiced during the Pierre Wack era in Shell (late 60s, 70s and early 80s). According to anecdotal evidence, the facilitated workshop-based approach to developing scenarios emerged within Shell during the mid 80s.

According to many participants, the original motivation for including the clients and users of the scenarios in the development of the scenarios and making it a process of conversation and dialogue was to increase the possibility that the scenarios will be accepted by the clients and that the scenarios will be relevant to them, since the clients will have actively participated in the development of scenarios and have ownership of the content. In addition to the above, including the clients in the developing of the scenarios leverages the specialized knowledge the clients have, which is especially important in decision making projects. Finally, according to the interviewees, by having the clients participate in the process, the clients learn more and internalize this learning more efficiently.

While conversation and dialogue enable the necessary people to get involved in the development of the scenarios, all participants of this research described the social benefits of the facilitated conversation as fundamentally important objectives in many scenario planning projects. In some cases, these objectives were described as the primary purpose of the scenario planning project, for both single organization and multi-stakeholder projects. However, it was argued that if scenarios are developed offline and not as facilitated conversation process, it may not be to possible to achieve these social

benefits; or, the effectiveness and efficiency of the process might not be the desired one. Thus, if achieving the social benefits is an important objective of a scenario planning project, then the development of scenarios needs to be a facilitated conversation process than an offline one.

4.6.6 Conclusions

In conclusion, this research indicates that scenario planning experts make the exploration of the future and the development of scenarios a collective, social and conversational process. Scenario planning experts carefully select individuals for specific reasons and form the scenario development team. Through various activities that take place during the facilitated workshops of a scenario planning project, scenario planning experts stimulate targeted conversation and dialogue among the members of the scenario team and further manage this process so that specific objectives and outcomes are achieved. The primary objective is to effectively explore the future collectively. Other related outcomes include the emergence of novel insights and deeper understanding, the development of shared and mutual understanding among the participants, accommodating divergent perspectives, identifying common issues and opportunities for collaborative action and improving the working relationship among the members of the scenario team. Making the development of scenarios a collective and conversational process among the relevant people is essentially a choice that scenario planning experts make. An alternative is to develop the scenarios without the participation of the clients, recipients and the other relevant people, however, in that case, it may not be possible to achieve the social benefits of scenario planning at all or at the necessary level of quality. Table 17 provides an overview of the theme and shows which cases support the findings presented in this section. Table 18 serves as evidence for the prevalence of the theme in the data.

Theme and subthemes	Supporting cases
Catalysing conversation and dialogue	All participants
o Inviting individuals to participate in the scenario development process	All participants
o Stimulating conversation and dialogue	All participants
o Managing conversation and dialogue	All participants

Table 17: The theme catalysing conversation and dialogue, along with the cases that support the findings.

Int #1	*Dialogue is always one of the purposes of a project. Whenever you are dealing with strategy, you are dealing with conflict. Because people have different ideas of what the future is, what could be, what the capabilities are. You know, we are human, we are going to differ on how we see the world and what's an ideal. That's just normal in the way things work.* […] *You try to set the rules of the game, you try to make sure that nobody dominates, you break into small groups, because it is easier to have more discussion amongst a small number of people. If you are in a large group, there are usually three voices that dominate.*
Int #4	*So, you intervene. And what got me the work I did in Europe was, I was facilitating the strategic conversation with a leadership group in [company name, country]. And we were doing the key driving forces and stuff like that. And what I have noticed was that they would think of putting something up without it being better than what was up there already. So, I said, "Here is what I would like to ask you to do. If you want to put something up there, or if you want to take something off there, you have to put something better in its place. Otherwise, you leave what is up there.* […] *So, always speak to the minorities, not only to who is talking. Say 'So, what do you think Cho, what is in your mind, I can see you thinking about this'. And they will say stuff which nobody has said. 'Jeez look at that, that's useful!' So that's an introvert typically. So, speak to the minorities, make sure that the conversation is widely shared, feel free to intervene, you must have built enough authority so that they know, if you say 'Can you just hold on with that thought and give [name] a chance', they must know.*

Int #5	*I see scenario planning also as a deal. That I listen at your story, I won't comment, I won't judge, but after that you have to listen to my story. For me, that's a big element in the dialogue in scenario planning. And it is not necessarily about the future even. I feel whether you compare different interpretations of the present, is very similar to debating different scenarios about the future. And it is this kind of process that for me is the essence of the whole thing. This is not a debate. What you are trying to achieve is to make the different perspectives and worldviews at play explicit in a non-judgemental, non-confrontational manner.*
Int #6	*And it is through a structured process of strategic conversation and dialogue that participants make their assumptions explicit and share with each other their perspectives and worldviews. And this then serves as the basis for common ground and collaboration.*
Int #8	*This is the general process, of how the clustering happens. So, we have like 120 driving forces and then you give people dots, coloured dots, and each person votes on each that is most important and most uncertain. So, people would say 'it is about the pace of change of technology, fast vs slow'. And somebody would say 'Yeah, but it is not just that, it is whether it is disruptive or not disruptive'. … And then you talk about that for a while and then you shift to another one and you say 'OK, we talked about this one, but what about the other one, what about this thing that is a little bit different' and so you clearly build on those five themes, about the details… And then you say, 'OK let's take those and pick two and cross them and think about it first on your own and then as a group' … You say 'Take a minute and play around with these different things, different arrows, and see if these create an interesting set of scenarios to explore and make sure that it answers the focal question and make sure that there is actually a balanced scenario in each of the four things'*
Int #9	*The role of conversation is fundamental to scenario planning. It's no coincidence that Kees van der Heijden titled his book - Scenarios: The Art of Strategic Conversation. In my mind, scenarios are so valuable because they provide a framework and a space for groups to have a conversation - whether it's about future possibilities, current assumptions or any other important issues that are*

	raised in the exercise. Only in exceptional circumstances do scenarios immediately provide obvious answers or clear ways forward. In most situations, decisions need to get made through a process of dialogue and conversation - and it is then that the scenarios help, because they allow people to better understand the alternative viewpoints that are in play.
Report	In the *Manager's Guide to Practical Planning in Shell*, a section is dedicated to *The Focused Scenario Process*. Key extracts: '*All the people with a vested interest in the outcome of the workshop and with responsibility for carrying the work further should participate.*' (p. 1) '*The facilitator explains the rules of the game and defines the terms.*' (p. 2) '*The participants must now discuss what themes emerge*' (p. 3)

Table 18: Additional evidence demonstrating the prevalence of the theme *catalysing conversation and dialogue* in the data.

4.7 Chapter conclusions

In this chapter, the researcher presented the findings of this study, along with the supporting evidence. Based on the data collected through very extensive interviews with many of the world leading experts on scenario planning, the researcher developed six themes and twenty-six sub-themes. Specifically, this study found that scenario planning *experts seek to understand the clients of the scenario planning, establish the scenario focus, examine the external environment, develop scenario sets, challenge the assumptions and beliefs of the clients* and *catalyse conversation and dialogue*. Each finding was compared to the current literature and those in Table 19 below were shown to constitute novel contributions to knowledge. A summary of the six themes and the twenty-six sub-themes can be found below.

Section	Themes	Sub-themes/concepts
4.1	Understanding the clients	• Identifying: o Issues of concern of the clients o The appropriate use of scenarios o Assumptions and beliefs o Blind spots o Axioms and divergences o Limits of tolerance
4.2	Establishing the scenario focus	• Establishing: o The focal question(s) of the scenarios o The research agenda
4.3	Examining the external environment	• Searching for/identifying: o Theories of how the world works o Driving forces o Pre-determined elements o Critical uncertainties • Introducing novelty • Ensuring credibility
4.4	Developing scenario sets	• Developing: o The scenario logic o The structure of the scenario set o Sequences of causally linked events

		○ Combinations of future end states • Structuring the scenarios (the inductive and the deductive approach) • Organizing information
4.5	Challenging the assumptions and beliefs of the clients	• Introducing novelty • Stretching mindsets • Disconfirming certainty
4.6	Catalysing conversation and dialogue	• Inviting individuals to participate in the scenario development process • Stimulating conversation and dialogue • Managing conversation and dialogue

Table 19: The primary findings of this study. Based on the data, the researcher developed six themes and twenty-six sub-themes.

The six themes and twenty-six sub-themes that the researcher developed based on the data constitute the core findings of this study and the primary contribution to knowledge. In addition to the core findings of this study, the researcher identified several broader patterns in the data that run across the six themes. The findings of this study, the broader patterns in the data, as well as the implications of the findings are discussed in relation to the extant literature in the next chapter (Chapter 5).

Chapter 5: Discussion of findings

In this chapter, the researcher discusses the findings of this study in relation to the extant literature. In addition to that, the researcher presents and discusses several broader patterns that he identified in the data, along with the implications of the findings.

Specifically, the subject of section 5.1 is the similarities and differences in the practice of scenario planning between the participants of this study, as evident in the data. The patterns observed in the data regarding the degree of similarity among the participants are compared with the prevailing ideas in the literature, as covered in section 2.9 of this thesis. The next section (5.2) examines the idea that the GBN 2x2 matrix method is the 'standard' approach to scenario planning (as frequently stated in the literature – section 2.9), based on the findings of this study. The findings of this study have important implications regarding the appropriateness of the term intuitive logics for the name of the field, proposed by Huss and Honton (1987a, 1987b) and later popularized by Bradfield et al. (2005), as covered in section 2.4 of the literature review. This is the subject of section 5.3. The review of the literature revealed that the concept of plausibility has not been the subject of systematic research in scenario planning (section 2.4). While this study did not systematically examine the specific subject, the researcher suggests in section 5.4 a system of factors evident in the data that influence whether a scenario, or a novel piece of information in general, would be perceived as plausible (or not). Scenario planning is largely presented as a linear process in the literature (section 2.9). The findings of this study challenge this idea, and this is the subject of section 5.5. Sections 5.6 and 5.7 shed some light on the role of the scenario planning experts and on the notion of the client, two topics on which the literature of scenario planning is particularly scarce. In section 5.8, the researcher suggests that the six themes he developed can be used to demarcate the boundaries and the identity of the field. As covered in section 2.4 of the literature review, the boundaries of the intuitive logics approach remain unclear and there is no explicit way for defining what counts as the intuitive logics approach (and what does not). In section 5.9, intuitive logics scenario planning is framed as a problem-solving intervention. In section 5.10, the theme *challenging the assumptions and beliefs of the clients* (section 4.5) is compared with the extant literature. In addition to that, the researcher noticed striking similarities between

challenging the assumptions and beliefs of the clients and the theory of cognitive dissonance. This is the subject of section 5.11. In section 5.12, the theme *catalysing conversation and dialogue* (section 4.6) is compared with the concept of *strategic conversation* as it appears in the scenario planning and strategic management literature. The limitations of this study and suggestions for future research are presented in section 5.13. Finally, a summary and conclusion of this chapter can be found in section 5.14.

5.1 Similarities of practice

A most important aspect of the findings of this study is that all participants described seeking to enact the very same six practices in each and every scenario planning project. The six themes that the researcher developed based on the data are evident in each case of participant. In other words, this research found that there are remarkable similarities in the practice of scenario planning among the participants of this research.

At the same time, this study found that the way these practices are enacted, i.e. implemented and translated into specific actions, in specific places and at specific times, varies considerably, not only from participant to participant but also from scenario project to scenario project. While according to the data the six practices are firmly followed in every scenario project, no two scenario projects were the same, and the implementation of the practices each time seemed to some extent novel and improvisational.

The data also indicate that the way the participants of this study enact the six identified practices depends on the specific context they are facing each time. To provide a tangible example, all participants stated that the preferred way of understanding the clients is by conducting the interview and feedback process, a process that requires a considerable amount of time and other resources. In one case of a scenario project where there was not sufficient time to interview the clients, the participant organized a one-day workshop with the intention of understanding what the clients of the scenario project assume about the situation and what they would like to know about the future. In a second example, one participant explained that in cases where the members of the scenario team have materially divergent views and perspectives on the issues that the

scenario project is focusing on, the expert would only use the inductive approach to structure the scenario space. In cases where the views among the members of the scenario team are more homogenous, the participant explained that it might also be possible to use either the inductive or the deductive approach to structure the scenario space.

The findings of this study further indicate that the way the six practices are enacted also depends on the specific scenario planning expert. In other words, different scenario planning experts would handle the same situation in a different manner. Throughout this research it became apparent that not all participants of this research had the same knowledge, skills, competences, preferred ways of dealing with a situation, tricks of the trade and rules of thumb.

In relation to the scenario planning literature, this research sheds light on the contradiction that exists about the homogeneity of the practice of scenario planning. In detail, many authors report that "*there are almost as many ways of developing scenarios as there are practitioners in the field*" (Bradfield et al., 2005, p. 800), or report the existence of a "*methodological chaos*" or "*highly personalized"* scenario practices, although it is not always clear whether they refer to the intuitive logics approach to scenario planning, or scenario planning in general (e.g. Amer et al., 2013; Bradfield et al. 2005; Millet 2003; Piirainen and Lindqvist, 2010; Ramírez et al., 2015; Stewart 2008; Varum and Melo, 2010). At the same time, authors often describe the GBN process (Schwartz, 1991) as the "*dominant*" or "*standard"* approach to scenario planning or argue that the steps described in the GBN process are the main activities of scenario planning (e.g. Bradfield 2016; Derbyshire and Giovannetti 2017; Postma & Liebl, 2005; Ramírez & Selin 2014; Tapinos, 2013; Wright et al. 2013). These two claims might initially appear contradictory to each other and raise the question whether the practice of scenario planning is significantly different among the practitioners or whether there are similarities. The findings of the present study, which indicate that there are remarkable similarities in the practice of scenario planning at the ostensive level and that the practice of scenario planning is highly heterogeneous at the implementation level, not only reconcile this seeming contradiction but also challenge each of its two components.

5.2 On the GBN scenario development process

This research challenges the idea that the GBN 2x2 matrix based process (Schwartz, 1991) captures the main activities of the scenario planning process and that it constitutes the dominant approach of developing scenarios, two almost equivalent claims that are directly made (or implied) in the literature (e.g. Bradfield 2016; Derbyshire & Giovannetti 2017; Postma & Liebl, 2005; Ramírez & Selin 2014; Tapinos, 2013; Wright et al. 2013). This study found that scenario planning, as practiced by both Shell and GBN related participants of this study, is significantly richer, more complicated and involves a significant number of different activities that are not captured in the GBN process. This study also indicates that the GBN process cannot act as a normative guide to design and implement effective scenario planning interventions, because it does not include a number of activities that are fundamentally important for meeting some of the core objectives of scenario planning e.g. challenging the assumptions and beliefs of the clients.

The researcher suggests that it is more useful to think of the GBN process as a particular way of identifying critical uncertainties and structuring the scenario space rather than a description of the scenario process or a normative guide to design and implement effective scenario planning projects. In the GBN process, this corresponds to "*Step Four: Rank by Importance and Uncertainty*" and "*Step Five: Selecting Scenario Logics*" (Schwartz, 1991, p.228-229). Three of the participants of this study described following these two steps as steps to identify critical uncertainties and to structure the scenario space, under specific circumstances. However, in most cases participants used these two steps as an aid to derive only tentative formulations of the critical uncertainties and the structure of the scenario set, revising them later on in the scenario process. Almost all participants that were associated with Shell insisted that they would never use the GBN process to identify critical uncertainties and structure the scenario space, noting that visualizing and positioning the scenarios in a two by two box is not the same as identifying the critical uncertainties using ranking.

5.3 On reasoning and the intuitiveness of the logics

The findings of this study indicate that the term *intuitive logics* is not an appropriate name for the specific tradition of scenario planning since it is not representative of what

scenario planning experts do (at least according to the participants of this research). Scenarios are neither intuitive images of the future nor are they developed in an intuitive manner. On the contrary, this research found that scenario planning is fundamentally an analytical process. Specifically, two core and defining practices in scenario planning are examining the external environment and developing the scenario logic. All participants of this study strongly emphasized the importance of examining the external environment prior to developing scenarios and conducting research and analysis in order to advance the understanding of how the relevant part of the world works. This understanding serves as the foundation for drawing conclusions about the future and developing the scenarios. Scenario planning experts also carefully develop the reasoning behind each scenario, articulate and formalize it, check for inconsistencies and make sure it is packaged in a form that is easy to communicate and be understood by the audience. The scenario logic, the reasoning behind the scenario, links the understanding of the past and present and how the relevant part of the world works with the future, and explains why and how a scenario might come about.

The term *intuitive logics* was introduced in the scenario planning literature by Huss and Honton (1987a, 1987b), claiming that the core characteristic of the Shell and SRI approach is that scenarios are developed '*from an intuitive, logical perspective*' (1987a, p.23). The term was later adopted to refer to the Shell, GBN and SRI approaches to scenario planning. While Huss and Honton did not clarify and elaborate on what exactly they meant with the phrase '*from an intuitive, logical perspective*', by closely examining the work and language of Huss and Honton (1987a, 1987b) and other publications from that period, the researcher found reasons to suggest that it was <u>not</u> Huss and Honton's intention to indicate that the scenarios are developed based on intuition. This suggestion is based on Huss and Honton's style of writing (e.g. they define the intuitive logics approach by comparing to trend and cross impact approaches that are described as <u>more quantitative</u>) and also based on the distinction and debate during that was ongoing during that period of time regarding quantitative and qualitative methods (e.g. Bell, 2003; Godet, 1983; Gordon, 1992; Ramírez & Selin, 2014; Schnaars, 1987). It is interesting to note that while quantitative approaches are often defined as those approaches that involve mathematical and statistical models and computer simulations, qualitative approaches are defined as those that involve none of that. Therefore, an

alternative explanation is that Huss and Honton used the term intuitive to indicate that the Shell/SRI approach is a qualitative approach, but chose a different term than qualitative, in order to separate it from other qualitative techniques such as the Delphi techniques, morphological analysis, nominal group techniques. What is deeply troubling however, is the fact that the term *intuitive logics* was adopted as the name of the field, when its meaning is diametrically antithetical to the core and defining characteristic of the approach.

5.4 On the concept of plausibility

The concept of plausibility is one of the foundational concepts in the fields of scenario planning, foresight and future studies and it is considered fundamentally important by many authors in the literature. There is wide consensus among the authors that scenarios must be perceived as plausible by the audience (e.g. Amer et al. 2013; Bradfield et al., 205; Godet, 2000; Ramírez & Selin, 2014, Schoemaker 1993; Selin, 2006; Spaniol & Rowland, 2018; van der Heijden, 2005; Wright et al., 2013). Despite the importance that is placed on plausibility, very few authors have examined the concept in a systematic way (two notable exceptions to this are Schoemaker, 1993 and Ramírez and Selin, 2014) and plausibility is still surrounded by conceptual ambiguity. In addition to that, the relationship between the constructs of plausibility, (internal) consistency and credibility is not always clear and, on many occasions, plausibility is defined in terms of these or other variables. For example, Kees van der Heijden, when considering the principles that one needs to follow when developing scenarios, writes: "*Each of the scenarios must be plausible. That means that they must grow logically (in a cause/effect way) from the past and the present and reflect current knowledge*." (2005, p. 225). While this study did not specifically aim to address the knowledge gap related to plausibility, the researcher elaborates on the concept of plausibility based on the data. In addition to that, the researcher suggests a number of factors that influence whether a scenario – or a novel piece of information, e.g. a theory or an analysis - will be perceived as plausible by the audience or not.

All participants of this research insisted that scenarios need to be perceived as plausible, otherwise the clients will not accept the scenarios and the scenario planning project will be considered unsuccessful. Scenarios that were described by the

interviewees as plausible are those scenarios where the relevant people accept that the future situation described in the scenario may possibly happen. This constitutes the working definition of plausibility, based on the data. Additionally, this research indicates that scenario planning experts introduce novel information (e.g. an analysis of an issue, a theory of how the world works) to several people such as the clients of the scenario project, the scenario development team and other potential audiences. The intention is that the relevant people will accept this information, consider it as valid, internalize it, and most importantly use it. A number of participants actually argued that the best way (if not the only one) to internalize novel information is by actually using it. However, it is important to note that in many cases participants of this study provided examples where the clients appeared to accept the scenarios and considered them plausible without exhibiting any signs of resistance up to the moment when these clients were asked to make important commitments based on these scenarios and act accordingly, e.g. to develop strategy based on the scenarios, test the viability of a project based on the scenarios or publicly endorse them.

Finally, the researcher identified in the data factors that influence whether a scenario, or a novel piece of information in general, would be perceived as plausible (or not). These are:

- The degree of fit between the scenario and the existing knowledge and beliefs of the audience. For example, scenarios that stay close to what the audience already knows are more likely to be considered as plausible. On the other hand, scenarios that appear outlandish to the audience are more likely to be perceived as not plausible.
- The degree of fit between the scenario and the self-interests and goals of the audience.
- The perceived credibility of the source of the information. It is a judgement on the source of information rather than the information itself. For example, many participants mentioned that they prefer to introduce novel information through a neutral outsider who has no stake or interest in the process and will be perceived as more credible.
- The reasoning/explanation supporting the scenario and the quality of this reasoning. For example, all participants argued that a challenging scenario where it is not

explained why and how the specific future might come about will most probably be considered implausible.

- The process through which the novel information is introduced to the audience. More specifically, participants of this research explained that instead of presenting novel and challenging information to the clients, where the possibility of rejection is high, they prefer to guide the audience through a process of discovery, via which the clients reach the same information and conclusion on their own.

5.5. On the linearity of the process

In the literature, scenario planning is most often portrayed as a linear process that involves a series of steps to be followed in a sequential manner (e.g. most typically the GBN process). The findings of this study challenge the idea that scenario planning can be described by such linear processes. To provide a tangible example, in some projects that were examined by this research, the focal questions of the scenarios were developed in the beginning of the project and remained the same throughout the project. In a different scenario project, the scenario planning expert refrained from formulating a set of focal questions at the beginning of the project and only developed one once the scenarios had been developed. In a third scenario project examined, the participant and the scenario team developed a set of focal questions at the very beginning of the project. The focal questions were revised twice, once after a long period of research and after the scenarios were developed. In this study, scenario planning was described as a non-linear, iterative process. In addition to the above, five of the six themes that were developed (with the exception of developing scenario sets) were evident throughout the scenario planning process. The findings of this study indicate that attempting to develop scenarios based on a pre-existing linear process will most probably lead to sub-optimal results and value, an argument that was also made by many participants.

5.6 On the role of the scenario planning experts

The literature on the role of the scenario planning experts in scenario planning is particularly scarce, with only a few and occasional references on the subject. Clearly, this topic has been neglected. While this study did not aim to address the specific knowledge

gap, the researcher would like to offer a number of important observations by considering the findings of this study from this specific analytical perspective.

In our study, scenario planning experts were first and foremost process consultants, i.e. experts of the scenario planning methodology and process technology who design, implement and facilitate the scenario process. This is in line with the dominant image of the scenario planning experts in the literature (e.g. Bradfield, 2005; Phadnis et al., 2014; van der Heijden, 2005; van der Merwe, 2008). Our study further indicates that scenario planning experts not only influence the content of the scenarios in indirect ways (as one might have suspected) but also directly shape the content throughout the scenario process in a impactful way. It is important to note however, that participants of this research insisted that the ownership of the content lies with the scenario team, with many participants arguing that it is of paramount importance that the scenario team recognizes the content as essentially their own. According to the study's participants, their role is only to make suggestions to the clients and the scenario team, and it is the scenario team who approves or rejects these suggestions and ultimately owns the content. To provide some examples, all participants mentioned that during the scenario planning workshops they assign to the scenario team various tasks like identifying driving forces, critical uncertainties, developing influence diagrams, developing images of the future (scenarios, sketch scenarios) and explaining why these scenarios are plausible. Most typically, the scenario team would complete only part of the task that they are assigned, and it is the scenario planning expert who has to gather all the material produced, fill in the gaps, revise the material and in the next workshop present back to the scenario team the material. In this study, participants also influenced the content of the scenarios by performing the diagnosis of the issues of concern and the problem situation, making suggestions to the clients and the scenario team about the focus of the scenario project (focal questions and research agenda), identifying blind spots (and thus including the scenario project issues that would otherwise be left unexplored), identifying assumptions to be challenged, choosing and introducing experts and remarkable people in the process, conducting research themselves, creating content on their own (e.g. an influence diagram) and intervening during the workshops to e.g. ensure participation from all the members of the team.

Based on the above, it logically follows that if the scenario planning expert also has material knowledge of the issues that the scenario project is focusing on, this will have a positive impact on the quality of the scenarios. This was an argument that participants of this research very frequently made. Subject knowledge helps the scenario planning expert to, for example, complete the scenario development tasks that are assigned to the scenario team, introduce novel ideas and insights in the process, unearth the fundamental assumptions and the bias in the room, identify the blind spots of the clients, help the clients formulate high quality focal questions. It is very important to note that many of the participants consider their role as a scenario planning expert only part of their identity. For example, one participant argued that he/she is first and foremost a strategist and then a scenario planning expert, and a second participant considered him/herself as equally a researcher and a scenario planning expert.

5.7 On the clients of a scenario project

Throughout this study, participants used a variety of terms such as *decision makers*, *managers*, *audience*, *policy makers*, *clients* and *users* to refer to the group of people that are the target of the scenario activities. The researcher grouped these different terms under the term *clients*, which he used throughout this study. Therefore, the effective (but unarticulated until now) definition of the term *clients of the scenario project* is the group of people who are facing one or more issues of concern, whose needs and concerns the scenario project aims to address, whose assumptions and beliefs the scenario project aims to challenge and who will use the scenarios e.g. to formulate strategy, policy or to identify common objectives. In other words, the group of people who are the direct targets of the activities of the scenario project.

An important point that should be made is that not every person that is involved in a scenario planning project is necessarily a client. In many scenario projects that were examined by this study, the convenor and/or the sponsor of the scenario project, members of the scenario team, the trustees as well as other stakeholders were not members of the client group. A scenario project will typically involve a large number of people that have an active interest in its outcomes as well as other people, without necessarily being considered as clients, in the sense that these people e.g. will not use the

scenarios to develop strategy. Most importantly however, the data indicate that, while these people are not the clients of the scenario project, they may have a very significant impact on both the process and the content of the scenarios. In some cases, some stakeholders even defined what success looked like and had the power to veto and cancel the scenario project. Nevertheless, according to the participants of this study, the activities of the scenario project are designed and implemented having in mind to primarily serve the clients of the scenario project, while striking a balance with the restrictions imposed by other stakeholders.

As a final comment, participants of this research distinguished between the primary clients of the scenario project and secondary audiences. It is quite typical that the scenarios are developed primarily to address the issues and serve the needs of one specific group of people, and then be disseminated to larger audiences at a later point in time. Again, the activities of the scenario project are designed and implemented having in mind to first and foremost serve the primary clients of the scenario project.

5.8 Towards boundaries and an identity of the field

One of the most common criticisms in the fields of Futures Studies and Foresight is the lack of clarity and standards about the boundaries of the fields (e.g. Hines & Gold 2013; Marien, 2002, 2010; Slaughter, 1999). As Marien elegantly summarizes "*for those who persist in proclaiming that there is a 'field', I simply ask that you tell me who is in it, and who is not, and why*" (2002, p. 264). The situation is also fully captured in the following statement by Slaughter (1999, p. 836).

> '*At present anyone wishing to call themselves a futurist can do so without fear that this claim will be challenged or that it need be substantiated. This means that a wide variety of gurus, charlatans, self-publicists and amateurs are hawking their wares without compunction around the world and, in some cases, bringing the field of FS into disrepute. This obviously misrepresents what 'real' futurists consider that they are about and impairs the wider search for legitimation. Some clear ways are needed of defining who is a futurist (and who not) and of assessing the quality of their work.*'

While the above statement refers to the field of Futures Studies, the researcher argues that it applies in full to the intuitive logics approach. The review of the literature revealed that there are no clear boundaries and standards concerning what is considered as the intuitive logics approach and what is not.

The authors who criticize the lack of boundaries and identity in the fields of Futures Studies and Foresight, have often suggested that the fields can be defined and organized based on the activities of the practitioners. The researcher therefore proposes that the six practices that he developed can be used as boundaries and standards for the intuitive logics approach to scenario planning.

5.9 Scenario planning as problem solving

The findings of this study indicate that scenario planning constitutes a problem-solving intervention. According to the data, the starting point of a scenario planning project is the existence of a group of people that are facing a problem, captured in the form of a set of issues of concern. Participants of this study insisted that they simply will not engage in a scenario planning project unless there is a clearly identifiable client who is facing a problem (one or more *issues of concern*), the clients recognize that they are facing a problem, and the problem is of such nature that a scenario planning intervention is appropriate. The *raison d'être* for engaging in a scenario planning project and its *value* (or *utility* or *usefulness* or *success* or *effectiveness*) lies on addressing the problem that the client group is facing. Exploring, and systematically examining the future takes place in this context. This research found that scenario planning experts seek to understand the clients of the scenario project. This involves diagnosing the problem situation of the client (most prominently the issues of concern of the clients and the fundamental assumptions and beliefs that the clients are making) and probing what activities might be most appropriate to address this problem situation. The scenario planning project is then designed and implemented with the purpose of addressing this problem situation and helping the clients of the project. In this context, the theme understanding the clients does not only describe one of the practices of scenario planning, but the researcher suggests that it can also explain the effectiveness and performance of a scenario planning project.

The idea that scenario planning constitutes a problem-addressing intervention does not mean that it is impossible to develop effective scenarios outside the context of addressing the problems of the client as described above. However, definitions of success can be very different in other contexts and the activities that were described by the participants of this study might not be appropriate or sufficient to develop effective scenarios in other contexts.

The researcher also suggests that scenario planning can be viewed from the problem/solution perspective, where solution refers to the set of activities that intend to address the problem situation. The data indicate that the locus of the activities relating to problem diagnosis and formulation occurs at the beginning of a scenario project, and the rest of the scenario planning project concerns addressing the problem. However, problem re-formulation also occurs throughout the scenario planning process.

In relation to the literature, this study challenges a number of ideas regarding the first steps in a scenario planning project. Firstly, the researcher developed, based on the data, the concepts of *issue of concern of the client* and *the focus of the scenario project*, with the former expressing what the clients are fundamentally concerned about (relating to the clients' problem situation) and the latter expressing the area of the external environment that the scenario project will focus on (relating to an aspect of the solution). This distinction between what the clients are concerned about and the area of the environment that the scenario project will explore was considered as fundamentally important by the participants and it was clearly identifiable in their practice. Based on these findings, this study challenges the idea that a scenario agenda can consist of issues of concern or that the issues of concern of the clients can be directly used to express the focus of the scenario project as it is commonly claimed or implied in the literature (e.g. Bradfield et al., 2016; Derbyshire & Giovannetti, 2017; Schwartz, 1991). In addition to the above, an important finding of this research is that scenario planning experts dedicate considerable time and effort to deeply understand the client and diagnose the problem situation, before moving on to designing a solution to the problem situation and establishing the focus of the scenario project. According to the participants, rushing into solutions (establishing the scenario agenda or in general the focus of the scenario project) before having a deep understanding of the problem situation will most probably lead to

suboptimal results. It is very important to note that all participants of this research considered diagnosing the problem situation as part of scenario planning. Therefore, this research challenges the idea that the first step in a scenario project is to establish the scenario agenda as well as other descriptions of the scenario planning practice (most commonly those that refer to the GBN process) where the first step is to establish the scenario focus (e.g. MacKay & Stoyanova, 2017; Phadnis et al., 2014; Wright et al., 2013), as they do not capture the essential part of diagnosing the problem situation. The researcher argues that the concepts of issue of concern and focus of the scenario project, as well as the distinction between the problem situation of the client and the activities related to addressing the problem clarify this aspect of scenario planning.

Finally, this study confirms, but most importantly, clarifies and extends the idea that scenarios need to be *relevant* to the client if they are to be effective. A scenario is considered relevant if it addresses the concerns and needs of the clients of the scenario project (e.g. Amer et al., 2013; van der Heijden, 2005). The researcher, based on the finding that scenario planning experts seek to design and implement a scenario planning process that is appropriate to the circumstances of the clients, suggests extending the meaning of the term *relevance* to include referring to a sufficiently high degree of fit between the scenario planning process and the problem situation of the client.

5.10 On challenging the assumptions and beliefs of the clients

The practice of *challenging the assumptions and beliefs of the clients* will most probably appear familiar to the reader. Since Pierre Wack's seminal articles in Harvard Business Review and his assertions that the real target of scenario planning is the microcosm of the decision makers (1985a, 1985b), authors in the scenario planning literature have routinely repeated claims such as '[a key objective of scenario planning is] *to challenge conventional wisdom and reframe perceptions through changing mindsets*' (Wright et al., 2013, p. 631) or "*scenarios are not concerned with getting the future 'right'; rather, they aim at challenging current paradigms of thinking*" (Chermack & Lynham, 2002, p. 377). Similar statements can be found throughout the literature (e.g. Bood & Postma, 1997; Burt et al., 2006; Cairns et al., 2006; Chermack & Lynham, 2006; Derbyshire & Wright, 2017; Hodgkinson & Healey, 2008; MacKay & Stoyanova, 2017; O'Brien, 2004; Ramírez

& Wilkinson, 2014; Schoemaker, 1993; Tapinos, 2013; van der Heijden, 2005; van Notten et al., 2003; Wack, 1985a; Wilkinson et al., 2013; Wright et al, 2013). The problem with such claims is nicely summarized in the following criticism by Burt and van der Heijden: "*The scenario and futures studies literature is full of 'generic' benefits, which clients treat with a high degree of scepticism. For example, changes in mental models, future proofing plans. What do these really mean, and how can they be localised?"* (2003, p. 1024). In other words, while such claims in the literature are routinely repeated, their meaning is not clear and some argue that they have little substance. Or, in a closely related criticism by Burt and Chermack "*one of his greatest challenges - and one of the greatest challenges for any scenario practitioner - is using scenarios as a vehicle to affect decision makers' views of reality. Precisely how this happens and can be consistently achieved is still a mystery"* (2008, p. 291).

In contrast, the practice of *challenging the assumptions and beliefs of the clients* that the researcher developed is rather specific. The starting point is that there is a situation that is perceived as unsatisfactory, namely, the important assumptions and beliefs that the clients effectively treat as certain are essentially misconceptions, in the sense that they are either inaccurate or they are uncertain (the diagnosis of the problematic situation is captured in the practice *understanding the clients*). At its core, the practice involves introducing novel information to the clients that ideally has a number of essential properties: i) the new information disconfirms the clients' misconceptions, ii) it is intended to improve the clients' understanding of the situation, iii) it needs to be considered credible or valid initially by the scenario planning experts and eventually by the clients, iv) it needs to be impactful. Another defining aspect of the practice is that the clients are expected to exhibit resistance towards the new information, especially if that information is simply announced to them. For that reason, the practice also involves a number of activities that will contribute positively to the clients accepting the new information. The practice also captures the tension between challenging the assumptions and project failure, and the scenarios planning experts' intention to strike a balance, maximizing the value added to the clients while ensuring the success of the project. It is hoped that the intricate explanation presented in this paragraph adds clarity with regards to the contribution to knowledge offered by the present study.

The development of the practice of challenging the assumptions and beliefs of the clients also contributes to the literature in an additional way. In the literature, many authors make the claim that scenario planning changes the mental models of the participants and reframes perceptions (e.g. Chermack, 2005; Hodgkinson & Healey, 2008; Wright et al., 2013). However, in the literature, it is implied that changing the mental models of the participants happens automatically by simply developing scenarios or following the GBN process (e.g. Glick et al., 2012). This study posits that challenging the assumption and beliefs of the clients is one of the mechanisms through which mental models can be changed.

5.11 The theory of cognitive dissonance

Challenging the assumptions and beliefs of the clients involves introducing novel information to the clients of the scenario project that are distant from and potentially contradict what the clients already know and believe. In addition to that, all participants of this research asserted that a typical first reaction of the clients is to exhibit signs of resistance towards this novel information, such as claiming that is not valid or refusing to consider it in general.

The researcher cannot help but notice the striking similarities between challenging the assumptions and beliefs of the clients and the theory of cognitive dissonance, as proposed by Leon Festinger in his seminal book *A Theory of Cognitive Dissonance* (1957). The original theory is fundamentally concerned with cognition and specifically the degree of fit between different elements of cognition. Festinger defines cognitions broadly as any knowledge that a person holds about the environment or himself/herself. According to the original theory the presence of an inconsistency between two or more such cognitions in a person's head will evoke a negative affective state and/or a negative motivational state. In the words of Festinger:

> 'T*hese two elements are in dissonant relation, if considering these two alone, the obverse of one element would follow from the other.*' (Festinger, 1957, p. 13).

'*The existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance. When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance.'* (Festinger, 1957, p. 3)

The researcher claims no expertise in the theory of cognitive dissonance, psychology or cognitive psychology but believes that the theory of cognitive dissonance provides a potential avenue for further research.

5.12 On strategic conversation

The theme catalysing conversation and dialogue that the researcher developed might give the impression that it is similar to the construct of strategic conversation which appears frequently in the scenario planning literature. Since the construct of strategic conversation was not covered in the literature review chapter of this thesis, this section serves the purpose of examining the construct of strategic conversation to highlight the differences with the findings of this research. The researcher hopes that this clarifies the differences between catalyzing conversation and dialogue and strategic conversation.

Strategic conversation in the scenario planning literature

Many authors claim that the term strategic conversation was coined by Kees van der Heijden, who introduced it in the scenario planning literature in his book *Scenarios: the art of strategic conversation* (1996). Since the publication of this book, a large number of authors in the literature refer to the construct of strategic conversation in their publications (e.g. Balarezo & Nielsen, 2016; Burt & van der Heijden, 2003; Burt et al. 2017; Cairns et al., 2006; MacKay & Tambeau, 2013; Ramírez et al., 2015; Ratcliffe 2002; Tapinos, 2013; Wilkinson & Eidinow, 2008; Wright & Goodwin, 2009).

Despite the fact that the term strategic conversation is very frequently mentioned in the scenario planning literature and many authors consider it as fundamentally important in scenario planning, very few authors have further developed the concept since the original work of van der Heijden. The meaning of the term remains unclear and the few definitions and descriptions of the construct that exist in the literature add little substance to it. For example, one of the few definitions of strategic conversation that

appears in the literature is provided by Peter Schwartz in the second edition of his book *The art of the long view*: "*A strategic conversation is a carefully thought-out but loosely facilitated series of in-depth conversations for key decision makers throughout an organization*" (1997, p. 221). The function and role of strategic conversation in scenario planning are also unclear. Some authors (e.g. Chermack et al., 2007; van der Heijden, 2005) suggest that strategic conversation is somehow connected to organizational learning, however, organizational learning is also another under-researched subject in the scenario planning literature. Another source of confusion is related to whether the strategic conversation takes place within the scenario planning process or the strategic conversation takes place in an organization and scenario planning contributes to it.

Strategic conversation in the strategic management literature

It appears that the term *strategic conversation* was coined by Frances Westley (1990) in the organizational literature, who defined it as "*verbal interactions within superior-subordinate dyads focusing on strategic generalities*" (p. 337-338). Westley developed and suggested the concept of strategic conversation (based on micro-sociological theory on interaction rituals) in order to examine the interactions between middle managers and strategic decision-making systems in the context of organizational integration and cohesion. In a similar manner, Hoon (2007) defines strategic conversation as the "*informal interactions between senior and middle managers*" (p. 927) and positions it in a very similar context: interpretation and strategies emerge "*from the intertwined activities of managers at different levels"* (p. 924).

Scenario planning as an integrative mechanism

This research found that scenario planning experts seek to stimulate the generation of conversation and dialogue among members of the scenario team, but most importantly they seek to guide and shape this conversation and dialogue with the purposes of generating new knowledge, developing a shared understanding, developing a mutual understanding, surfacing the assumptions, beliefs and perspectives of the members of the scenario team, accommodating divergent perspectives and identifying common objectives and developing a better working relationship. Based on the finding of this research, and also the tentative suggestions of van der Heijden (1996), the researcher suggests that scenario planning can act as an integrative mechanism that has the

potential to foster group cohesion and integration. This suggestion is also supported by the work of Lang and Ramírez (2017), observing that scenario planning contributes to building new social capital.

5.13 Limitations of this study and future directions

This study, as all academic work, is of course not without limitations and the researcher openly acknowledges this. Some of the perceived limitations of this study are general characteristics of the methodological choices that the researcher made in his attempt to answer the research question and fulfil the research aim and objectives. As with most qualitative, interpretive research, the findings of this study are interpretations of a single researcher and in this case based on the accounts of participants in an interview setting. In most cases however, the perceived limitations of this study are natural consequences of the fact that a PhD thesis, and a piece of research in general, cannot cover all and everything about a subject. While this study did not attempt to answer all the possible questions about scenario planning, the intention of the researcher was to develop a robust foundation, based on sound and systematic empirical research, that guides future research and upon which new knowledge can be build. Each limitation can be expressed as an opportunity for further research and vice versa. The field of scenario planning is so young in terms of maturity that the opportunities for further research are numerous. Almost all topics of the synthesis chapter can be the focus of future research. For example, in section 5.4. the researcher presented, based on the data, a number of factors that influence whether a scenario will be perceived as plausible or not. Further research could be experimental, quantitative, deductive and examine this topic further, seeking to confirm whether these factors do influence the perceived plausibility of the scenarios. Further to that, the steps that the researcher took to ensure the high quality of the findings and conclusions of this study were covered in section 3.7. The limitations and opportunities for further research that the researcher considers as most important are described in detail below.

Firstly, the findings of this research are based on the accounts of the scenario planning experts that were interviewed during this study. Participants of this study provided very detailed accounts of their practice and past scenario planning projects.

They were able to explain their actions, thoughts, intentions and were reflexive. They answered every question of the researcher in a convincing manner and their claims were substantiated and supported by further evidence. They admitted failures, weaknesses and occasions where they wished that they have done things differently, under the only condition that the researcher would not publicly humiliate them. While the findings are most valuable, they are restricted by not directly observing practice. Direct observation of world leading scenario planning practice is recommended as a topic of future research, to confirm, refine and further elaborate the findings of this study and would also add the perspective of the observer. However, the researcher expects that it would be considerably challenging to gain access to high quality data for this type of research.

Secondly, and most importantly, the overarching concern of this thesis and of academics and practitioners in the field of scenario planning is how to design and implement effective scenario planning interventions. This research begun addressing this issue by identifying and uncovering the practices and methodology of scenario planning experts, the system of principles one needs to follow in order to be successful when exploring the future. What the researcher sees as a natural continuation of this study, is to empirically test and verify these, in a deductive or retroductive way (Blaikie, 2009). Such research would empirically observe and measure dimensions of success and effectiveness and directly connect them to practices of scenario planning experts and contextual factors. One particular theoretical paradigm that lends itself well to this task is *critical realism* due to its distinctive model of causality that connects actions, context, mechanism and outcomes. The adoption of critical realism to study the effectiveness of scenario planning interventions has also been recently suggested by Frith and Tapinos (2020).

Thirdly, a major aspect in scenario planning is the actual use of the scenarios. Most typically, scenarios are used to inform action, e.g. to formulate strategy, or to identify opportunities for collaboration. A limitation of this study is that it did not investigate how the scenarios are put into use. Achieving both a deep understanding of the development of scenarios as well as how the scenarios are used would be an unmanageably broad topic for the purposes of a PhD degree. As an opportunity for further research, it would be most interesting and valuable to investigate how the scenarios are used, the link between

scenarios and action, and if possible, investigate the whole chain of events from the moment the clients realize there is a problem (are concerned about one or more issues) until the scenarios are put into action. Again, given the confidential nature of this work, the researcher expects that it would be considerably challenging to gain access to high quality data.

Fourthly, a key feature of this research is the unprecedented and remarkable access the researcher managed to gain to former members of the Shell and GBN scenario planning teams. Focusing on such a group of experts provided this study with high quality data and gave credibility to the findings. However, the practice of scenario planning by non-Shell and non-GBN intuitive logics experts was not examined in this study. The reason is the following. As also covered in section 5.8 and similar to what several authors in the peer reviewed literature have warned, there are no clear ways for defining who counts as a member of the intuitive logics approach, who counts as not and what the standards are for assessing the quality of scenario planning work (e.g. Hines & Gold 2013; Marien, 2002, 2010; Slaughter, 1999). Due to the lack of such boundaries, Marien has proclaimed that Futures Studies is not a field and famously stated "*for those who persist in proclaiming that there is a 'field', I simply ask that you tell me who is in it, and who is not, and why*" (2002, p. 264). While Marien's statement refers to the field of Futures Studies, her criticism fully applies to the field of intuitive logics. In addition to the lack of boundaries, the researcher also asked the participants of this study to recommend non-Shell and non-GBN intuitive logics practitioners, however, to no avail. In case the researcher had included non-Shell and non-GBN participants in this study, it would be possible to dispute the quality and credibility of this research based on whether the non-Shell and non-GBN participants are indeed members of the intuitive logics approach. The researcher thus prioritized the credibility and high quality of this research compared to seeking to include non-Shell and non-GBN intuitive logics scenario planning experts. The researcher believes that a crucial next step for the intuitive logics field is to establish a clear identity and boundaries for the field, as several authors have also suggested. Once this has been achieved, further research is required to identify non-Shell and non-GBN intuitive logics experts and to examine their practice of scenario planning.

Finally, scenario planning is being applied in many different contexts, problems and cases, such as in businesses, in policy making, in multi-stakeholder projects. A future line of research might explore the similarities and differences among the different contexts.

5.14 Chapter conclusions

In this section, the researcher presented and discussed several novel broader patterns that cut across the findings of this study as well as implications of the findings. In some cases, the broader patterns and implications directly challenge the established beliefs, assumptions and views in the scenario planning literature. In other cases, the broader patterns shed light on areas that were left largely unexplored in the literature. Specifically, an interesting and novel pattern across the findings of the study is that the practice of scenario planning was remarkably similar among the participants of this study, however, the way it is enacted can be vastly different among scenario planning experts and projects. The term *intuitive logics* is found not to be an appropriate term to describe the practice of scenario planning, at least as practiced by the participants of this research. The practice of scenario planning is found to be vastly different from what is described in the literature. The GBN 2x2 matrix-based method was not the 'standard', 'preferred' or 'dominant' method for the participants of this study. The researcher also identified several factors in the data that influence whether a scenario will be considered as plausible or not, elaborated on the clients' place in the scenario planning project and the role of the scenario planning expert. Based on the findings of this study, the researcher suggested boundaries and (elements of) an identity of the field. Finally, the chapter concluded with limitations of this study as well as suggestions for a future research agenda.

Chapter 6: Conclusions

In this study, the researcher focused on and sought to address a research gap of fundamental importance: the lack of an *adequate* theoretical and methodological foundation underpinning scenario planning. The objective was to develop knowledge that is both academically rigorous and relevant to practitioners and contribute to bridging the gap between theory and practice. As also covered in Chapter 1 of this thesis, the lack of an adequate theoretical and methodological foundation is not a mere academic inconvenience. A theoretical and methodological foundation of scenario planning would guide and inform its growing practice, offer the much-needed credibility and legitimacy to the field, and provide a focus for further field building and development. In detail, the objectives of this study, as formulated by the researcher were:

> *To advance the understanding of the practice and methodology of scenario planning,*
>
> *To build a foundation of principles and theory of scenario planning from that better understanding of practice.*

To address this research gap and develop a theoretical and methodological foundation, the researcher sought to deeply examine and understand the current practice of scenario planning i.e., what scenario planning experts do when exploring the future and why. The intention of the researcher was to immerse himself in the world of scenario planning experts and deeply understand the meanings, interpretations, and motivations they assign to their actions. This served as the basis for developing more technical and abstract concepts. In detail, the research question that the researcher formulated and sought to answer was:

What practices do intuitive logics scenario planning experts enact when exploring the future?

To answer the above open ended, exploratory research question, the researcher adopted a qualitative, interpretive research design and conducted multiple case studies. The main method of data collection was in-depth interviews, and the data were analysed using thematic analysis.

In total, the researcher developed *six themes and twenty-six sub-themes*, based on the data. Specifically, this study found that scenario planning experts seek to *understand the clients of the scenario planning, establish the scenario focus, examine the external environment, develop scenario sets, challenge the assumptions and beliefs of the clients* and *catalyse conversation and dialogue*. The six themes constitute the core contribution to knowledge of this study. In line with the objective of this research to bridge the gap between theory and practice, the six themes are fundamentally *a system of principles*, or, in practice theory terms, *a system of practices*. While the findings of this study inform the practice of scenario planning, they are not a process guide or a series of steps to be carried out. They are conceptual in nature and can be better understood as the abstract, generalized, schematic form of an aspect of practice, the grammar that dictates the actions taken by practitioners. Scenario planning experts enact the principles by engaging in specific actions, in specific times and places. At a first level, they constitute a description of how participants of this study practice scenario planning. Additionally, and most importantly, the researcher suggests that these six themes serve as a *normative guide* that can guide the implementation of scenario planning. Scenario planning experts are the ones who have the knowledge and expertise of what works in practice and why it does so. The themes that the researcher developed based on the data encapsulate this knowledge and expertise. In other words, the themes that the researcher developed constitute the *methodology-in-practice* of the participants of this study and *the suggested methodology of scenario planning*.

The findings of this study contribute to the theoretical development of scenario planning. The novelty of the contribution lies in comprehensively capturing and formalizing the practice of scenario planning through systematic examination of the actual practice of intuitive logics in a manner that is relevant to practitioners. In line with the objectives of this research, the strength of the theoretical contribution lies in bridging the gap between theory and practice. The review of the literature revealed that a theory of scenario planning that is both academically rigorous and relevant to practice has yet to emerge and the subject is clearly under-researched (section 2.10). The form of the contribution of this study (a system of practices/principles) matches the expectations of several authors in the literature, (in the field of scenario planning, practice theory and more generally), who have provided suggestions and direction regarding how such a theory of scenario planning may look like. For example, Derbyshire (2017) has suggested that a theory of scenario planning '*would likely consist of a set of generally agreed-upon over-arching principles that guide the implementation of scenario planning as it is tailored to suit the particular context in which it is applied'* (p. 77-78). Within the field of practice theory, Felman and Orlikowski (2011) argue that theoretical generalizations '*may be better understood as principles that can explain and guide action*' (p. 1249). In a similar manner, Eikeland and Nicolini (2011) suggest that one form that practice based theories may take is of *grammatical knowledge* that organizes and structures practice. Finally, Corley & Gioia defined theory as '*a statement of concepts and their interrelationships that shows how and/or why a phenomenon occurs*' (2011, p.12). Therefore, the findings of this study match the expectations of how a theoretical contribution may look like in this field of study and this research contributes to the theoretical development of the field.

This research also contributes to and advances the practice of scenario planning, primarily in two ways. Firstly, the six themes and twenty-six sub-themes can serve as a normative guide and provide an appropriate level of granularity that enables practitioners to effectively design and implement scenario planning interventions. Secondly, this research reveals aspects of practice that are not captured neither in the peer reviewed literature nor in the scenario planning guides and reports that may not be peer reviewed or distributed through academic channels. Some notable examples of the latter include *Scenarios: An Explorer's Guide* by Shell (2003), *The Futures Toolkit* from The Government Office for Science, UK (2017) and the *Strategic Foresight Primer* from the

European Political Strategy Centre (2017). In addition to that, this research adds much requested precision, granularity, and detail in various aspect of practice that is currently missing from the literature. For example, as also covered in section 5.8 of the Discussion chapter, the literature is full of generic claims regarding changing the mental models of the clients. As other authors have observed (e.g. Burt & van der Heijden, 2003), it is not clear what changing the mental models actually means and how it can be achieved. This study provides a rich description of what constitutes challenging the assumptions and beliefs of the clients, how it can be achieved, and also reveals a fundamentally important aspect of the phenomenon, the narrow band of tolerance (section 4.5). An additional example, while the term *remarkable person* appears frequently in the literature, there is no clear definition of who a remarkable person is and the role such a person plays in a scenario planning process remain elusive. The researcher formally established it as a concept and clarified the properties of a remarkable person and the role she plays in a scenario planning project. In a similar manner, the researcher added granularity, detail, and formally established concepts such as the inductive and deductive approaches to scenario planning, the structure of the scenario set, the scenario logic, the snippets approach to developing scenarios, the focal questions of the scenarios, uncertainties and many more. As a final example, participants of this research strongly emphasized the distinction between the issues of concern of the client and the focal issue that the scenarios focus on. This distinction, while particularly important for the participants of this research was not revealed by the review of the literature.

Importantly, the findings of this study are based on remarkable and unprecedented access to high quality data. The researcher invested significant time and energy to gain access to high quality cases and hence high-quality data. In total, the researcher interviewed nine scenario planning experts. Each of the participants had been employed in the past by either Royal Dutch Shell or GBN and was a key member of the scenario planning team, and almost all of the participants had dedicated more than two decades of their career to scenario planning. Some of the participants held high profile positions and led the scenario development team in Shell and other international organizations (e.g. World Economic Forum). In order to immerse into the world of scenario planning experts, the researcher spent a significant amount of time with each of participants. In most cases, the researcher spent at least eight hours with the participant.

To the researcher's knowledge, there has never in the past been such an in-depth study of scenario planning with such access to high quality data.

While the six themes that the researcher developed based on the data constitute the core findings of this study and the primary contribution to knowledge of this study, the researcher identified in the data several broader patterns that run across the data and the findings of this study. The implications of this study, along with these broader patterns, are significant and novel as they either directly challenge some of the fundamental and well-established beliefs and assumptions in the literature on scenario planning or they inform areas in scenario planning that had received little attention until now. Some of the most interesting and novel broader patterns and implications of the findings of this study can be found below.

Firstly, there was remarkable consensus among the participants of this study regarding the practice of scenario planning and the principles they follow. The six themes that the researcher developed were evident in each case of participant, however, the way these practices and principles are enacted (put into action, in specific time and place) can vary significantly, depending on the scenario planning expert and the scenario planning project. Secondly, this study found that scenarios are neither intuitive images of the future nor are they developed in an intuitive manner; the process of developing scenarios is primarily an analytical process rather than an intuitive one. Therefore, the term *intuitive logics* is not an appropriate term to describe what the participants of this study do when exploring the future. Thirdly, in this study, the GBN 2x2 matrix-based process was clearly observed to be neither the dominant nor the standard way of developing scenarios (or identifying critical uncertainties and structuring the scenario space). The findings of this study indicate that the GBN 2x2 matrix-based process does not sufficiently describe scenario planning as practiced by the participants of this study and cannot act as methodology, process or as a normative guide to developing scenarios.

In addition to the above, the findings of this study allowed the researcher to elaborate on the role of the scenario planning expert, the clients of the scenario project, on the concept of plausibility and the factors that influence whether a scenario will be

perceived as plausible or not. Finally, based on the findings of this study, the researcher was able to recommend boundaries and (elements of) an identity of the field.

This is important work that comes at a time that is most needed. Recent developments, surprises and shocks such as the COVID-19 pandemic and the exit of the United Kingdom from the European Union demonstrate the urgent need for methods and approaches such as scenario planning. This study informs and guides the practice of scenario planning, providing the field with credibility and legitimacy and offering a foundation for further field building.

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Appendix

Participant #2 Interview Extract	First order code	Second order theme
So, what we were doing in our workshops is we would certainly listen to them, interview them, we would do some research and then we would get people who were responsible for these explanations. It is not always environmental. So, in the electricity generation business, they were people who critiqued the structure of the electricity business and they have written books. So, you could ask these people to come in the room, come to the workshop and at the beginning, they would present for half an hour. And then, there would be a debate. And they might even go away very often. They might not even stay. But they would come, they would give their explanation, and the people would listen, and then you discuss it. And then you go away and then we would talk about "what do you think?". Because we, the scenario planners could position ourselves as less extreme than the speaker. So, if there is a kind of business-as-usual bubble, then we would try to expand the view of the client. So, we would get somebody crazy out here – not crazy because the	Introducing novelty Stretching mindsets Introducing novelty	Challenging the assumptions and beliefs of the clients Challenging the assumptions and beliefs of the clients Challenging the

crazy people fool around- but a critic of the industry whose position is out there to come in. So, we stretched their minds, but then we, the scenarios planners have interviewed them, so we are operating here. So, we would say, "What do you think, do you think they are crazy?" I am here, on the boundary of what you find acceptable.	Stretching mindsets Identifying limits of tolerance	assumptions and beliefs of the clients Challenging the assumptions and beliefs of the clients Understanding the clients

Participant #7 Interview Extract	First order code	Second order theme
And it is normally the first thing that you do when an organization wants to engage in a strategic planning exercise, first - of course - you figure out what is the current reality in the organization, what is the strategic agenda, what are the questions that people are asking themselves, what is worrying them, what is keeping them awake. So out of the strategic agenda comle all kind of issues, questions, things that people wonder about and they do not know the answer. That is the strategic agenda. Normally, in a scenario planning process, you use that as a starting point to do two things - and this is where it has an impact on the actual project. First of all, from that strategic agenda, you can derive what should be the focus of the scenarios. The strategic agenda belongs to the organization. And it	Identifying the issues of concern of the clients	Understanding the clients

decided to do scenarios to shed light on that. To generate context that gives meaning to those questions. So, from that, from the strategic agenda, you can actually determine what is the correct focus for the scenarios, what the scenarios should be about, in order to be relevant for the strategic agenda. So that is called the focal question or the focal issue of the scenarios. So, you see, the strategic agenda belongs to the organization. The focal issue and the focal question in my knowledge, and this is how it was used in the Shell, belongs to the scenarios.	Establishing the focal question(s) of the scenarios	Establishing the scenario focus